INTERNET OVERLOAD: DISASTER IN THE MAKING? BEST CD-ROMs UNDER $25

SNEAK PEEK: MICROSOFT OFFICE 97

PC WORLD

OCTOBER 1996

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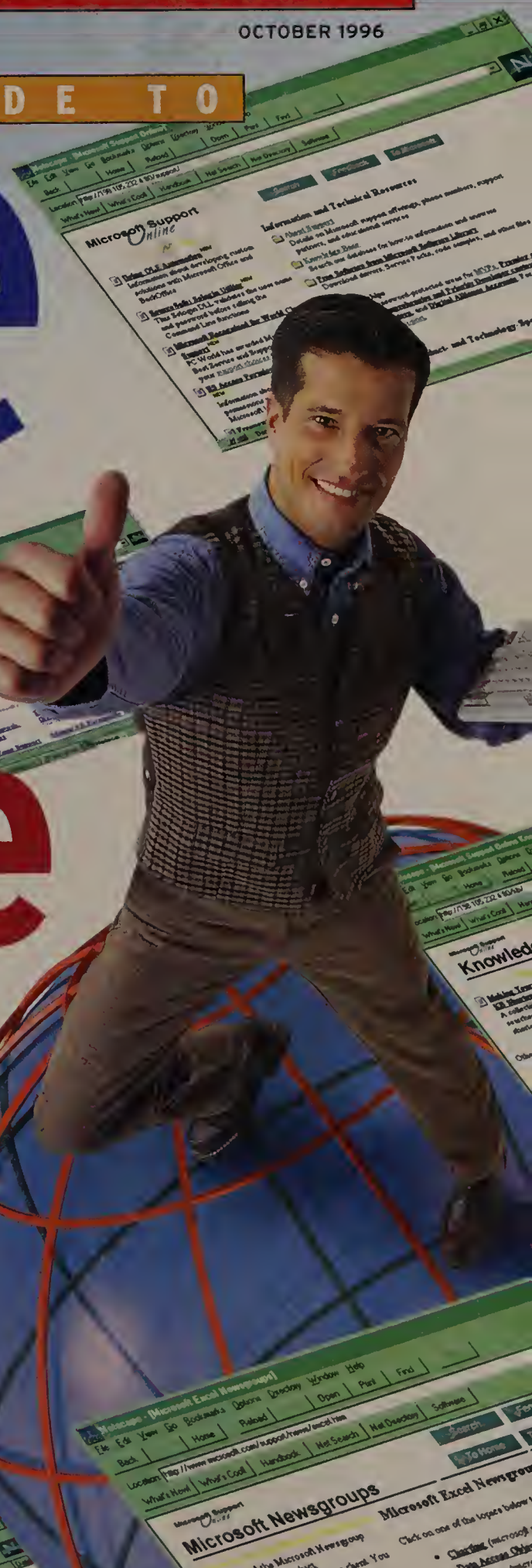

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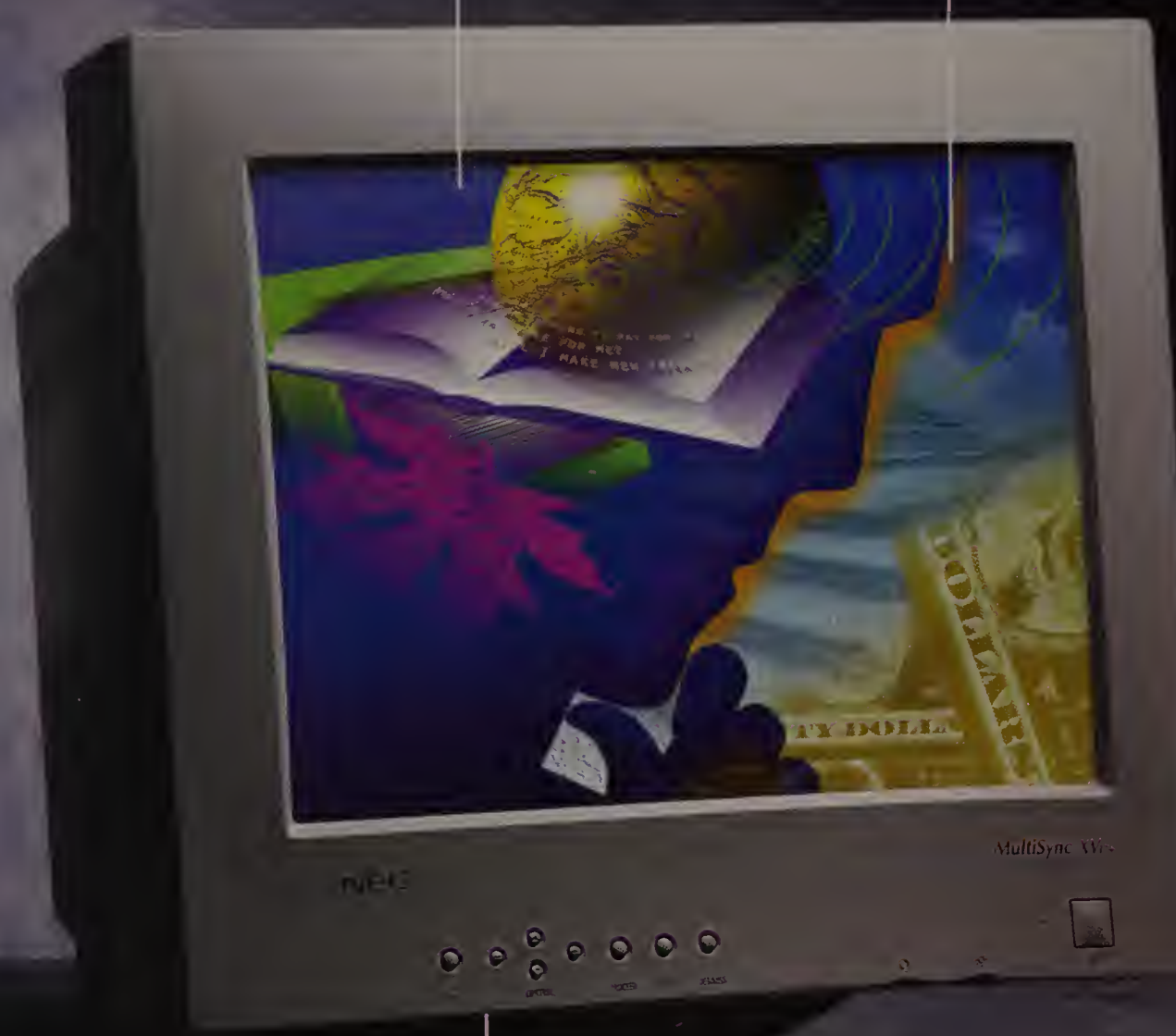
for Windows 95

Lets you simplify
installation.

OptiClear Screen Surface

Enhances contrast while also
eliminating glare.



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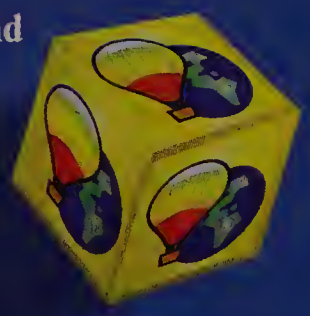

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OCTOBER

VOLUME 14 ◆ NUMBER 10 ◆ MULTIMEDIA EDITION

COVER STORY

128 **THE COMPLETE GUIDE TO FREE HELP ONLINE**

HOW-TO Phone tech support can cost as much as $35 a question and keep you on hold for days. The no-cost alternative: online tech support. Here's our road map to free help online: how to get to direct support, FAQs, file libraries, newsgroups, and more, and find what you're looking for fast. Plus a handy pullout reference card.

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REVIEW It's a fax machine, printer, copier, *and* scanner. But multifunction devices usually come with compromises in quality. We review the latest from Canon, HP, JetFax, Ricoh, Sharp, and Xerox.

181 **DO IT ALL! TIPS FOR MASTERING YOUR OFFICE SUITE**

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115 **TOP 10 NETWORK SERVERS**

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Additional material available on PC World Online

260-M2 **20 CD-ROMS UNDER $25**

From the addictive gaming of SimCity Classic to buying tips in Consumer Reports Cars, we found 20 CD-ROMs worth more than their sticker price.

260-M7 **TITLE REVIEWS**

Helicopter simulation in Hind and Longbow; strategies for selling in Guerrilla Marketing.

260-M10 **HARDWARE REVIEWS**

Top 5 CD-ROM drives, sound boards.

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COVER *Photography by Robert Cardin*
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58 BROADCASTERS USE TV SIGNALS TO SEND DATA
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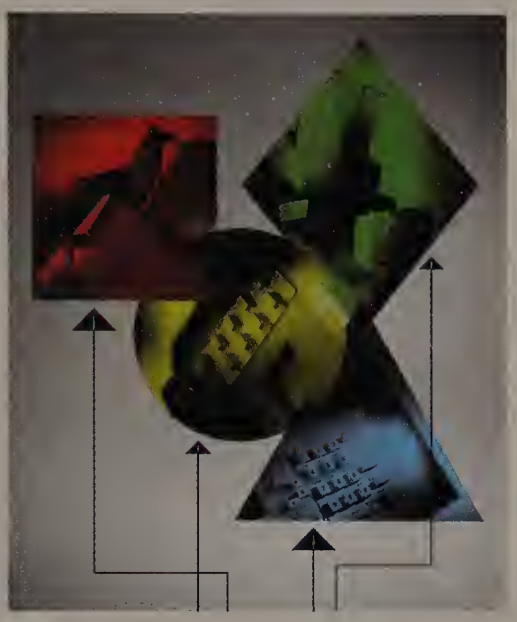
62 UPGRADES TO NT SERVER AND NETWARE INCLUDE WEB SETUP FEATURES
Latest network OSes connect to the Web.



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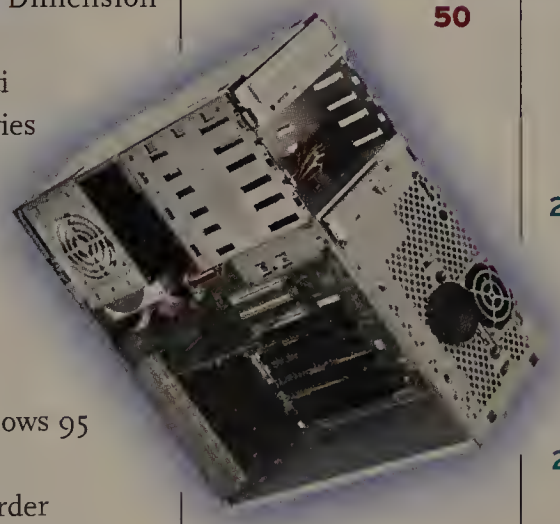

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TOP 100

197 A P-200 FOR UNDER $2000
TOP 100 Dramatic price drops make this month's Top 100 a tightwad's paradise: Lower chip prices and dirt-cheap RAM produce the first Pentium-200 we've ever seen under $2000. The latest Best Buy graphics boards are selling for less than $180. A huge $133 price drop makes the $275 U.S. Robotics Courier V.Everything V.34 our new number-one external modem.

200 POWER DESKTOPS
TOP 20 Power doesn't always have to come at such a high price, including bargains like Micron's $2549 P200 Millennia and Multiwave's $2520 Ultra Power.

208 BUDGET DESKTOPS
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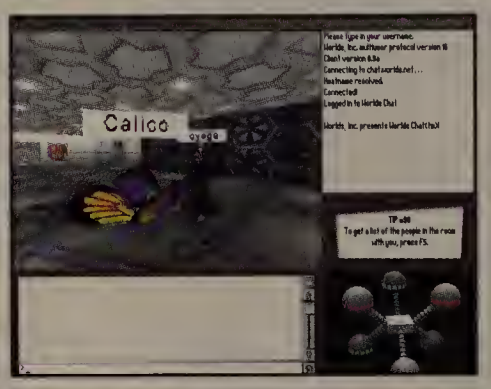

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260 **HOME OFFICE** Bass gets Win 95...and lives!

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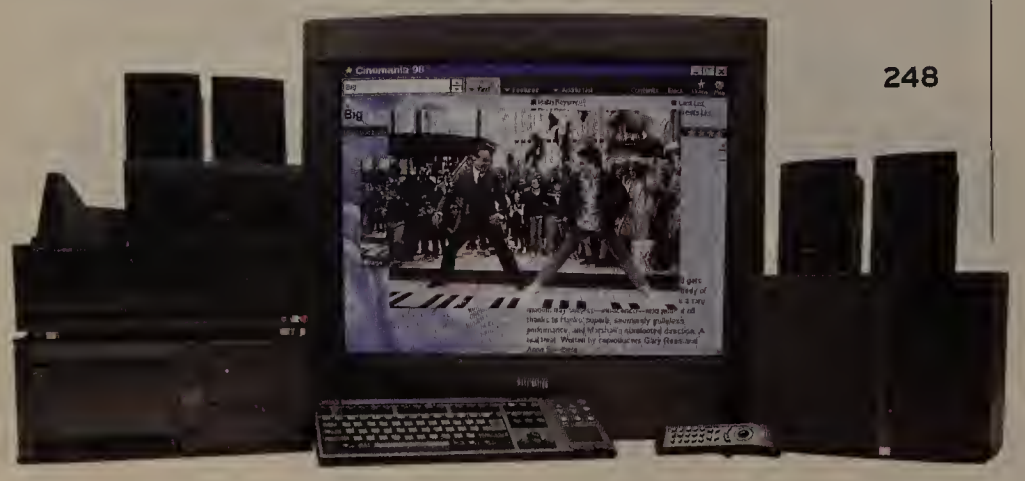

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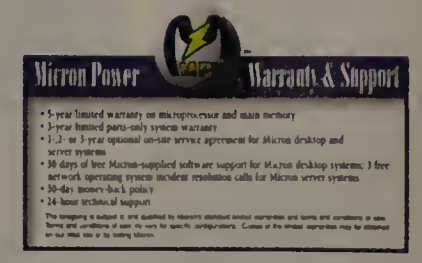

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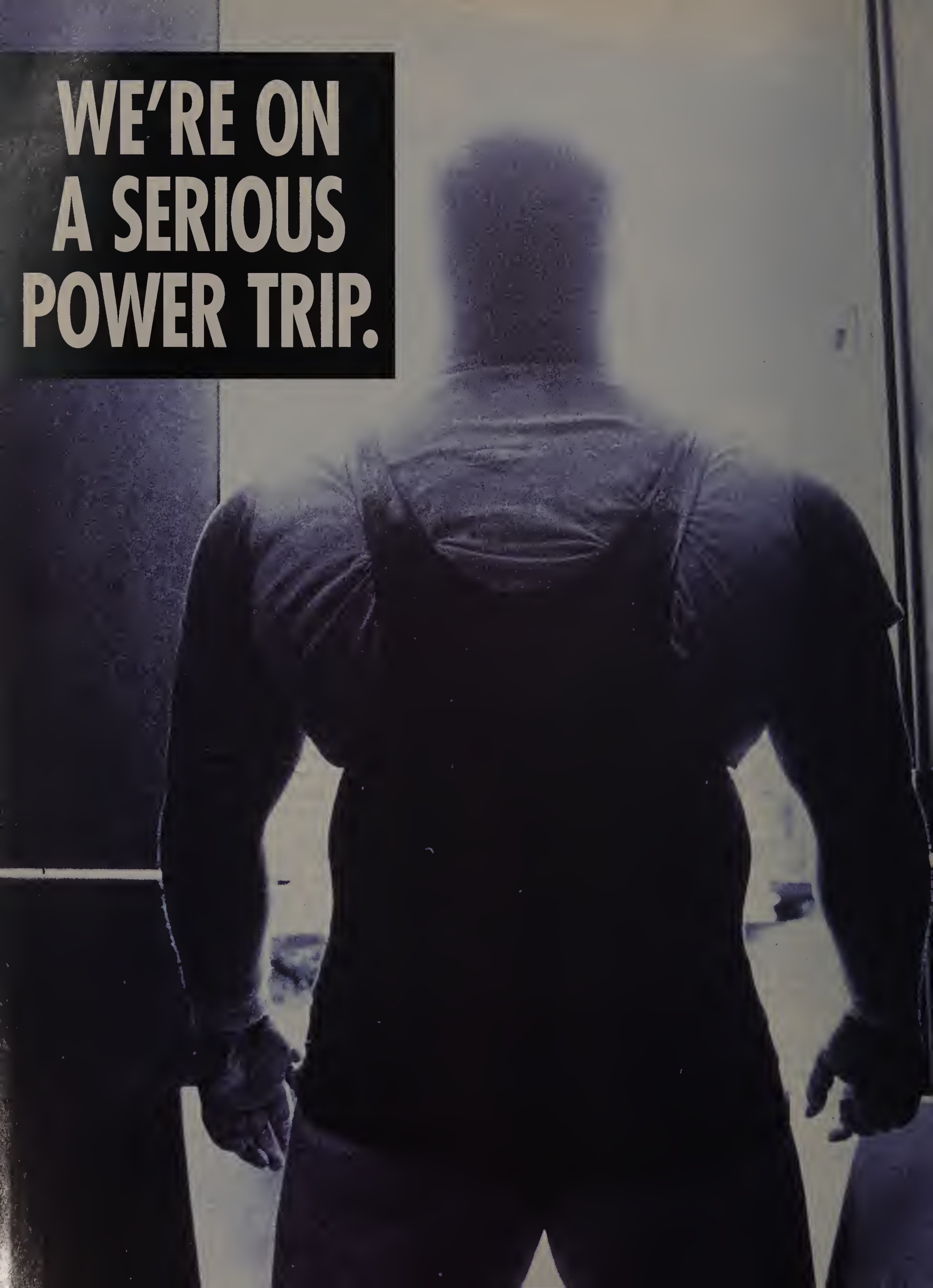

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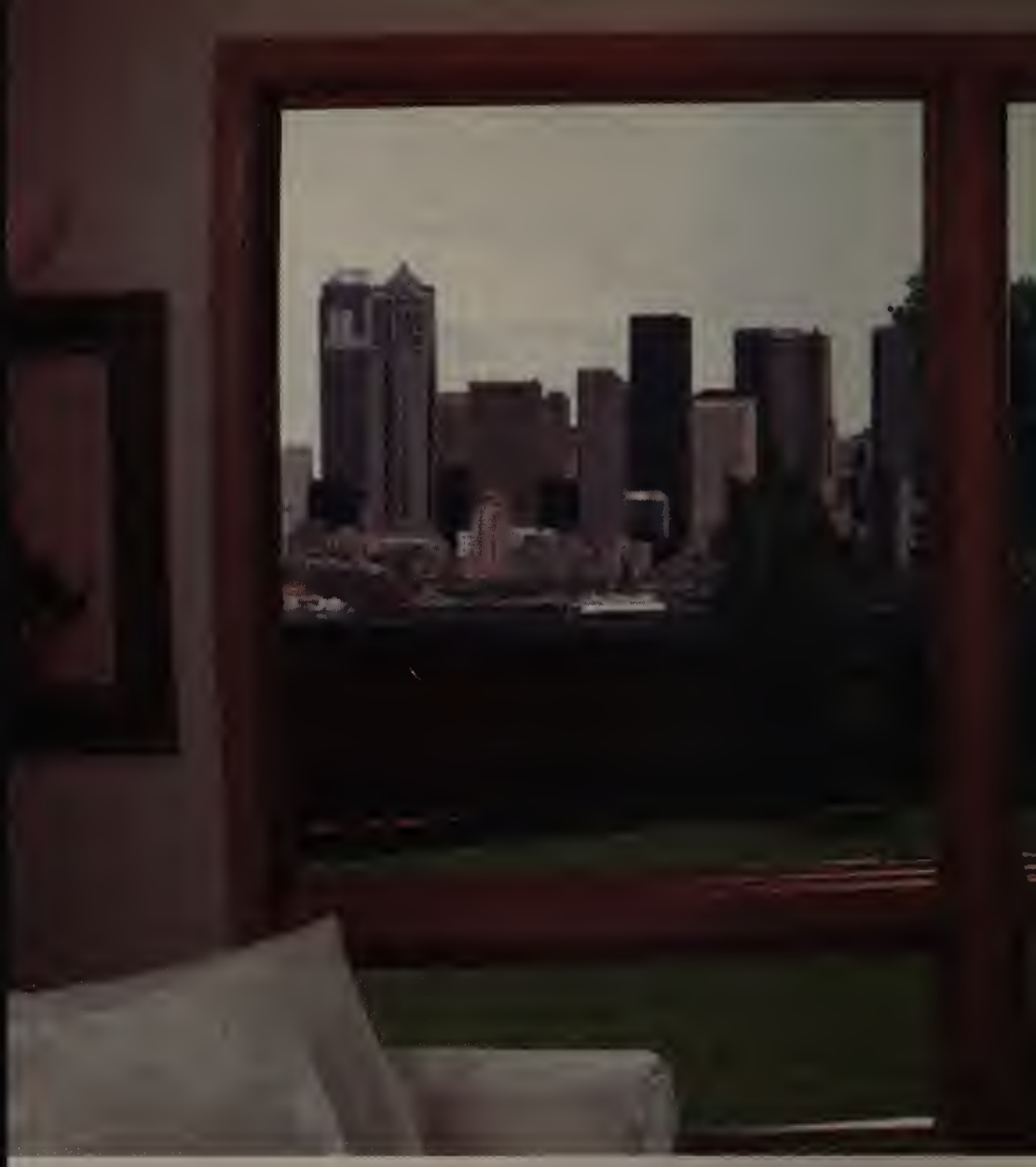

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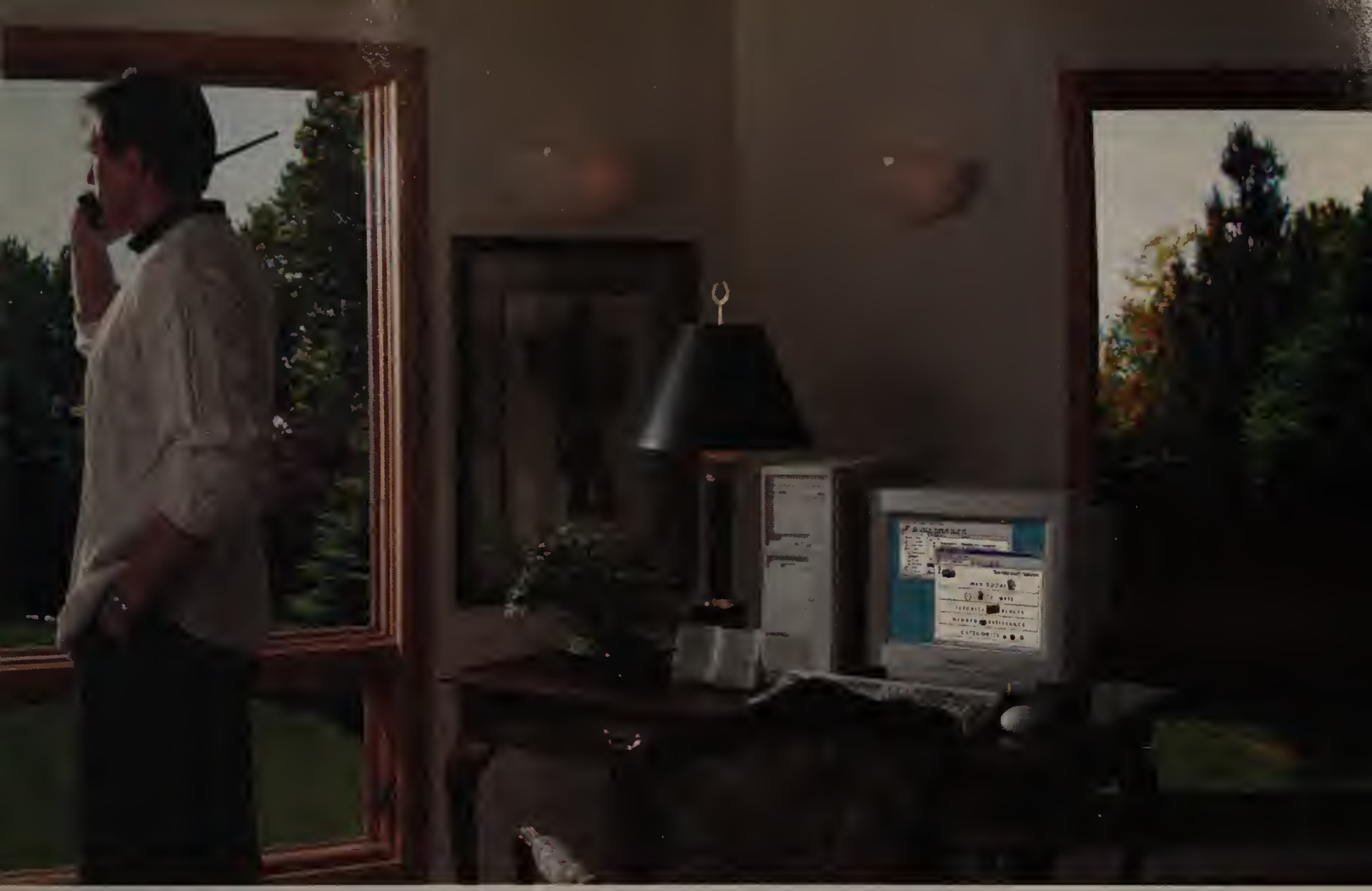

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Internet connectivity is or soon will be built into your word processor, spreadsheet, and database applications. It will be the way you schedule meetings, collaborate on projects, contact customers, update prices, and do research. It will obviously carry your e-mail. And the Internet will be an integral part of the next release of Windows 95, rather than just a click-it-or-leave-it icon. So what happens when everything you do depends on the Internet, and the Internet is out to lunch?

What happens when everything you do depends on the Internet, and the Internet is out to lunch?

BLAME IT ON THE ETHER

THE QUESTION OF INTERNET reliability arises because, unlike telephone or package delivery services, the Net has no guarantor of dependability or performance. When you buy access to the Internet, you put your messages on whatever unpredictable paths they may happen to follow through a "system" assembled from thousands of disparate resources owned by many different companies and institutions. Fingers can point in thousands of directions if a message fails to get through or arrives days late.

So far you've probably experienced nothing worse than such delays when using the Net. But what does the future hold as ever-increasing numbers of users and larger files strain a system that wasn't designed to handle such enormous loads? Bob Metcalfe, Ethernet inventor and tireless expert observer of the Internet, forecasts a collapse. For a variety of informed opinion, read James A. Martin's "Internet Overload: Disaster in the Making?" You'll also find tips on avoiding Internet traffic jams, plus news about some impending developments that may provide relief.

If the Internet is the network that's all things to all people, then multifunction devices are the hardware equivalent. They combine printing, faxing, copying, scanning, and sometimes modeming all in one box; they save cubic yards of office space; and they need only one kind of supplies. These all-in-one units can save you money as well.

If this were the full story, multifunction devices would be right for everyone. But these jacks-of-all-trades have a major drawback: Their operating instructions are bound to be more complex than those for single-task machines. So deciding whether you should rely on a multifunction device turns out to be more difficult than it first seems. "Office in a Box" helps you through the process.

First, it tells you how the individual functions of each all-in-one device compare with their common stand-alone equivalents. It lets you know whether using one box for all of these functions is more hassle than it's worth. It informs you which of six products is best. Finally, it provides shopping tips to speed you on your way should you decide that a multifunction device is right for you.

FINDING HELP WHEN YOU NEED IT

IT'S HARD TO SAY WHETHER office software suites have more features than the Internet has sites, but it must be a close race. Just as Net search engines never seem to find exactly what you're looking for, the help systems in Microsoft Office, Corel WordPerfect Suite, and Lotus SmartSuite seldom seem to come up with the tip you need most urgently. "Do It All! Tips for Mastering Your Office Suite" shows you the quickest path to using some of the most important features of these three major office suites.

But if you're still puzzled, turn to "The Complete Guide to Free Help Online." To make life easier (and more affordable) for you, Kirk Steers tracked down free online sources of valuable technical information. Often you can exchange messages not only with company representatives but also with other PC users who are experiencing problems and frustrations like your own. It's surprising how often solutions can come from peers rather than from professional support personnel. Now that asking technical questions can cost you $35 a pop, Steers's article may even pay for your *PC World* subscription the first time you find the support you need online. We hope so.

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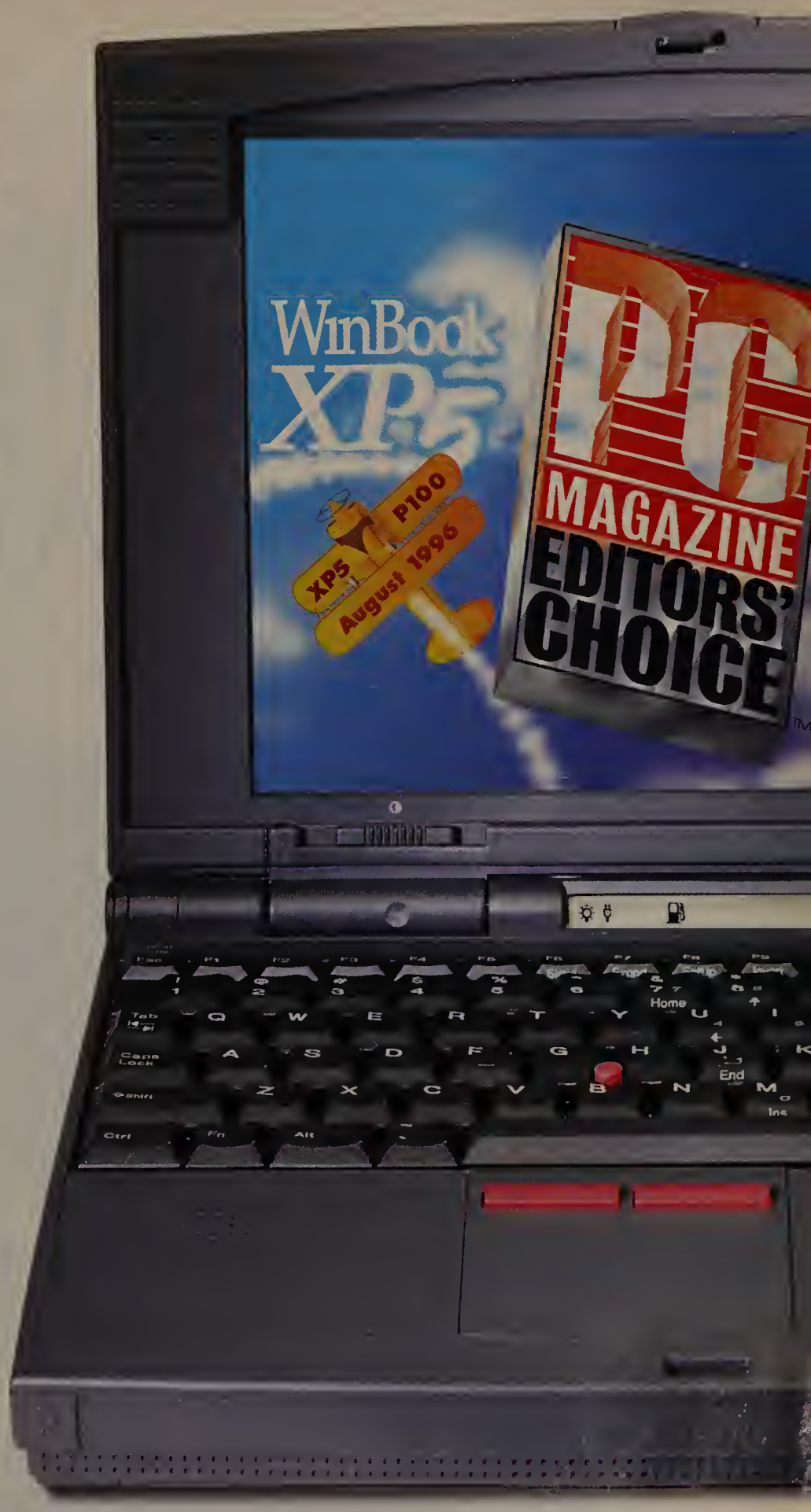

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YOUR TAKE ON: Wishy-washy browser review ◆ Win 95's first year ◆ Free speech online

STILL WONDERING WHICH BROWSER'S BEST

WHILE I ENJOYED your matchup of the Microsoft and Netscape Web browsers ["Best Web Browser," August], you failed to fulfill the article's title. No one product was crowned "best"; you threw a slew of browsers into the barrel of has-beens and gave Microsoft's Internet Explorer and Netscape's Navigator an even-heat evaluation. If there isn't a "best" Web browser to be found, perhaps a title that implies an evaluation, but not a KO winner, would have been more appropriate. As it was, I felt misled.

Secondly, while I am always grateful for whatever coverage OS/2 receives in your magazine, it appears that suddenly IBM and OS/2 don't have a browser ["Where Have All the Browsers Gone?"]. I don't pretend that Web Explorer is in the league of Netscape or Microsoft (not with IBM trying to license Netscape Navigator for Merlin), but to be ignored is often a greater insult than to be slammed. I would rather have seen Web Explorer in the barrel of noncompetitors than left out like a forgotten child.

Daniel MacEwan, Minneapolis

PLEASE HAVE SOME backbone ["Best Web Browser"]. I have used the beta version of Internet Explorer 3.0, and as a Web content developer, I find some of its capabilities very useful. However, in head-to-head competition Netscape Navigator is clearly on top and still one step ahead.

If you look at your own ratings in the article you'll notice that you scored Netscape higher in more categories than Microsoft. Because of this I was somewhat disappointed by the way the story concluded. Both of the products are very good, and anyone would be satisfied with either one. However, I was left with the feeling that the muscle of Microsoft swayed the conclusion.

Brad Thomas, Oklahoma City

I THOROUGHLY ENJOYED "Best Web Browser," but I have a question regarding a feature in Microsoft's Internet News and Internet Mail. You state that they can be viewed through Windows 95 Explorer, but I cannot find a way to do this.

Daniel B. Wilson, Microsoft Network

Editor's response: That feature was available in the prerelease versions of Internet News and Internet Mail that we looked at, but it was removed from the shipping version. Ordinarily, we review only shipping versions of products, but for this article we made an exception. The browsers were available to the public in beta form, so anybody could download them and use them. Because potentially millions of people were exposed to these high-profile products, we couldn't ignore them. –Yael Li-Ron

CAN'T GET AWAY WITH IT

AS A LAWYER active in the multimedia and online fields, I was particularly interested in "What You Can and Can't Get Away With Online" [August].

While the advice you gave was generally sound, I found the following comment misleading: "If you state a mistruth as an opinion, you're off the hook—you have a right to say what you *think*." This type of sweeping statement could get a lot of speakers in trouble.

Yes, an opinion may be protected speech, but only if a reasonable reader would conclude that the statement is *not* conveying facts about a person. The fundamental inquiry is whether the "opinion" is based on undisclosed underlying facts; if so, the reader will infer that the speaker knows certain facts about the subject that support the opinion and that these facts are detrimental. ▶

CROSS FIRE

Windows 95 Is a Giant Leap Forward

AFTER READING Stephen Manes's column ("Windows 95: Happy Birthday?") in your August issue, I wondered if he and I were using the same operating system. While no product could have lived up to the hype Windows 95 had, it has been a giant leap forward at my workplace. For example, peer-to-peer networking has greatly improved our site's file-sharing capabilities and saved valuable server space.

Manes also criticizes Win 95's lack of multitasking. But it does let you carry on a plethora of background operations while running your primary application. On a Pentium-133 with 16MB of RAM, I routinely browse the Net, edit HTML documents, use a word processor, and even play games, without ever having to reopen or reload a program—all while downloading a file in the background. Bottom line: Am I more productive? Yes!

Justin Carlson, Manhattan, Kansas

A Giant Leap? Keep Waiting...

IT WAS REFRESHING to read Stephen Manes's column on Windows 95. Of course, he only reiterated what Linux and OS/2 users were saying a year ago. Windows 95 is just a minor upgrade to Win 3.11, and it did not live up to Microsoft's lofty promises. But what do you expect from a company that made similar claims for Windows 3.1, Windows 3.11, Bob, The Microsoft Network, and Windows NT?

Meanwhile, OS/2 is probably on its ninth life, as IBM keeps quietly cranking out new versions. It was funny to read Manes's complaints about what Win 95 lacks and think, "Gee, OS/2 has had those features for years."

Finally, I agree with Manes on the product's undelivered promises: Where are all those native apps Microsoft said were in the wings for Win 95? Still waiting for NT 4.0 or Cairo, I guess. And I guess we'll have to keep waiting and waiting.

Steve Williams, Internet

MICHAEL KLEIN

As the New York Court of Appeals found in *Gross v. New York Times* (following the U.S. Supreme Court in *Milkovich v. Lorain Journal Co.*), where the statement "John is a thief" is defamatory, so too is the statement "I believe John is a thief."

In short, using such expressions as "I believe that..." or "it is my opinion that..." will not protect you when you are making an otherwise defamatory comment. If a reasonable reader thinks that you are conveying facts, then you've got a problem.

Adam M. Cohen, New York

YOU MUST FIRST DIAL A 1...

IN "BEST ONLINE SERVICES" [August], there is a point you fail to make: Most people are not going to subscribe to a service unless it offers a local access number in their area. For example, if I want to use CompuServe I have to be willing to pay once for the service and once for a long-distance call. Why pay twice?

Maurice R. Helmick, America Online

CUTTING CORNERS ON COMPUSERVE

ONCE AGAIN, the computer press has missed the boat on CompuServe pricing ["Best Online Services," August]. You write, "If you're a business traveler with an online expense account, it's the only way to fly," as if CompuServe were an expensive service.

I spend several hours a week reading and writing messages in CompuServe forums and Usenet newsgroups. However, CompuServe still usually costs me only $9.95 a month—less than even most flat-rate Internet service providers. How do I do it? By never logging in interactively. I use TAPCIS (a widely used shareware offline reader) and an offline Usenet reader to upload and download messages. With a 28,800-bps modem, I can download a day's worth of newsgroup messages or forum traffic in a minute or so. I then read it offline, with the meter off.

By contrast, America Online refuses to allow third parties to develop shareware offline readers—they want the meter ticking while you use their service. This is why I dropped my AOL account a while back. Although CompuServe has the same basic price structure, it's actually much cheaper than AOL if you do your work offline. It's even cheaper than most flat-rate Internet providers if you use your log-in time judiciously.

John Kafalas, Highland Park, Illinois

NONEXISTENT DRIVE

PC WORLD, I've always trusted you. But in this case I have to ask, Who are you serving, consumers or the industry?

Your article "Best Products of 1996" [July] lists Pinnacle Micro's Apex drive as the best technology for an optical drive. Let me explain something: This drive does not exist! And Pinnacle Micro has been promising it since mid-November 1995.

According to what I've heard, Pinnacle Micro now says that the Apex drive might be released in the last quarter of this ▶

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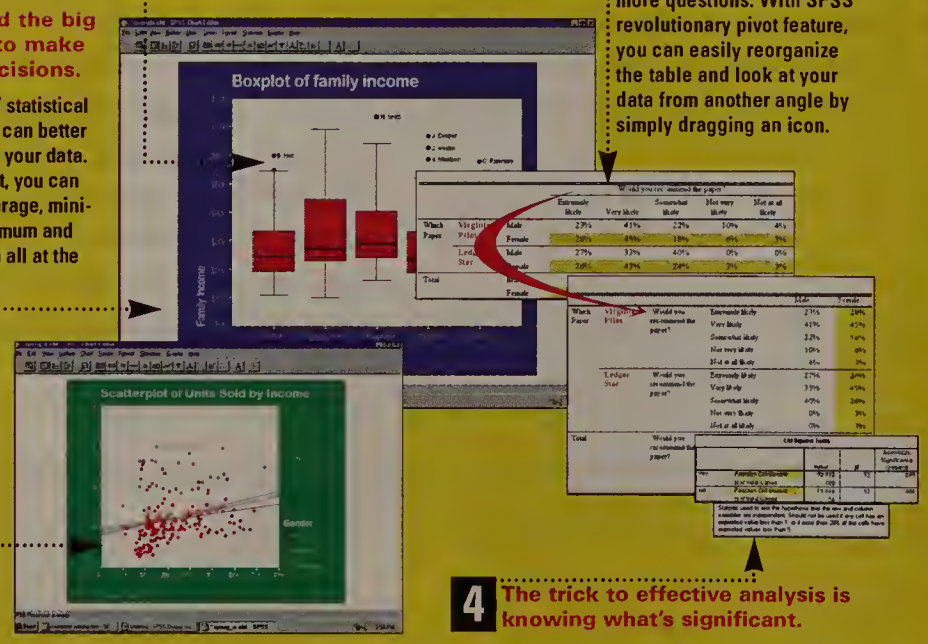

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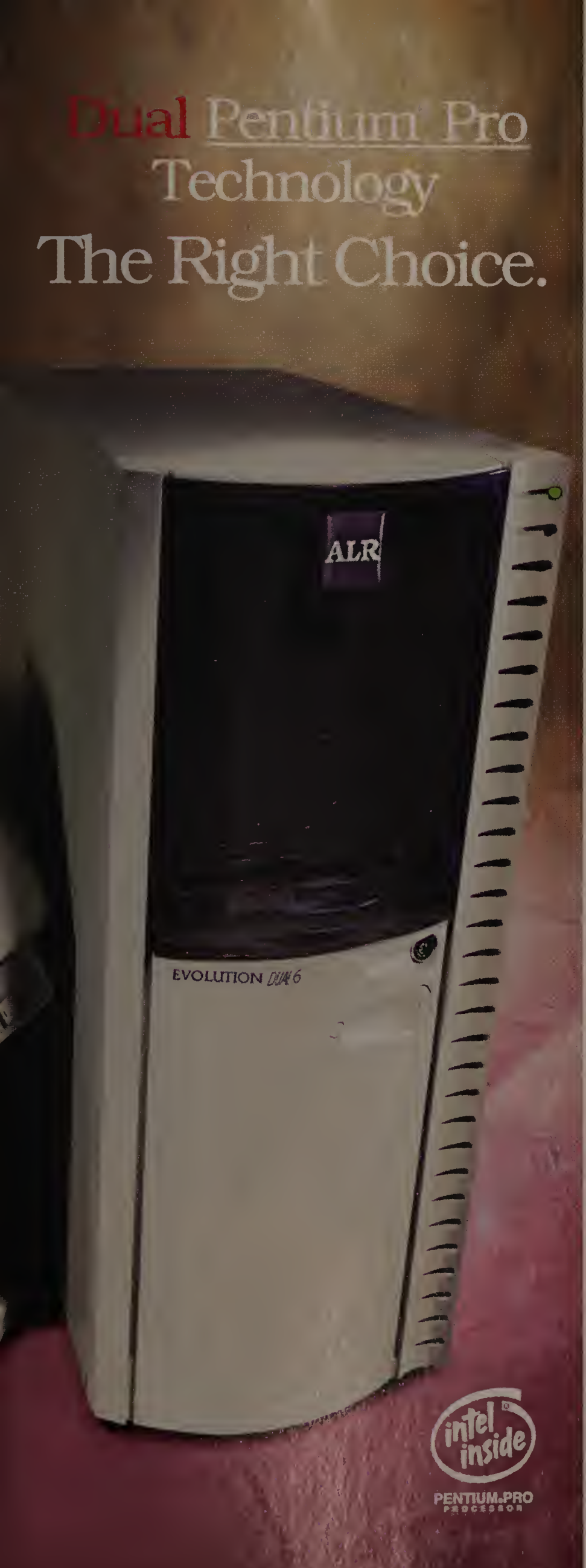

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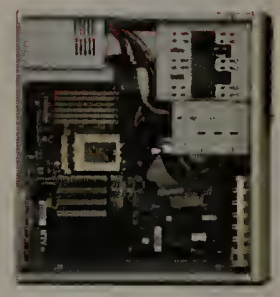

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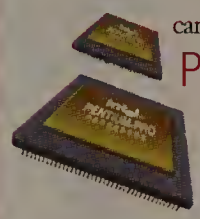

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ViewSonic 17GA	17"/16.0"	0.27mm	1,280 x 1,024	Yes	Yes	$799
ViewSonic GT770	17"/15.9"	0.25mm*	1,280 x 1,024	Yes		$899
ViewSonic 20G	20"/18.4"	0.28mm	1,600 x 1,280		Yes	$1,299
ViewSonic GT800	20"/19.1"	0.30mm*	1,600 x 1,280	Yes		$1,899
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year. Wouldn't that then make it a candidate for your "Best Products of 1997"?

James Caldwell, Toronto, Ontario

Editor's note: According to Pinnacle Micro, the Apex 4.6GB optical drive was released to end users and potential original equipment manufacturers in limited quantities in 1995 and 1996. The *PC World* readers who voted for the drive made their decision based on those units. In April this year, Pinnacle decided to redesign and relaunch the Apex drive, which is now scheduled for widespread release in the fourth quarter. **–Daniel Tynan**

CAMPAIGNING AGAINST CUTE

REGARDING PHIL LEMMONS'S statement, "The best cyberspace pages make ordinary printed matter look like high art," I think he and many other writers discussing the World Wide Web confuse information and entertainment. When I want "high art" or entertainment, I look for it, usually outside the Net. But when I want information, I want it fast and well structured. This is the great promise of the Web. Animated logos, singing and dancing buttons, and informationless graphics only slow us down.

You could campaign against "cute" Web pages and for high-quality information. How about a "glitz" control added to Web specifications so we could choose between bells and whistles on the one hand and just the facts on the other?

Mark Hodgson, Madison, Wisconsin

Editor's response: Your observation is an excellent one while bandwidth remains constrained. Exaggerated as the claims are for what the Internet can do today, however, I still think people will want more from it in the future than quick, structured information. Exactly what else people will want is yet to be invented. **–Phil Lemmons**

ONCE-A-MONTH TECH SUPPORT

FROM NOW ON, I'm outsourcing my tech support to *PC World*. The magazine is well positioned to fulfill these duties, having served me ably for some time now. Please keep me informed in the style I've grown accustomed to.

Paul D. Griffith, Norwalk, Connecticut ■

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.*

CORRECTIONS AND CLARIFICATIONS

The photographer's name was inadvertently left out of July's "All-Star Lasers." Credit is due to Robert Cardin for all images.

Contrary to information in "42 Tips for Taming Cyberspace" (August), the Prodigy version of ConnectSoft's E-Mail Connection program costs $14.95.

In researching our September 17-inch monitor review, PC World was incorrectly informed that the Iiyama VisionMaster Pro 17, a Best Buy in July, would be discontinued; and we dropped it from testing. We will retest it for our January Top 10.

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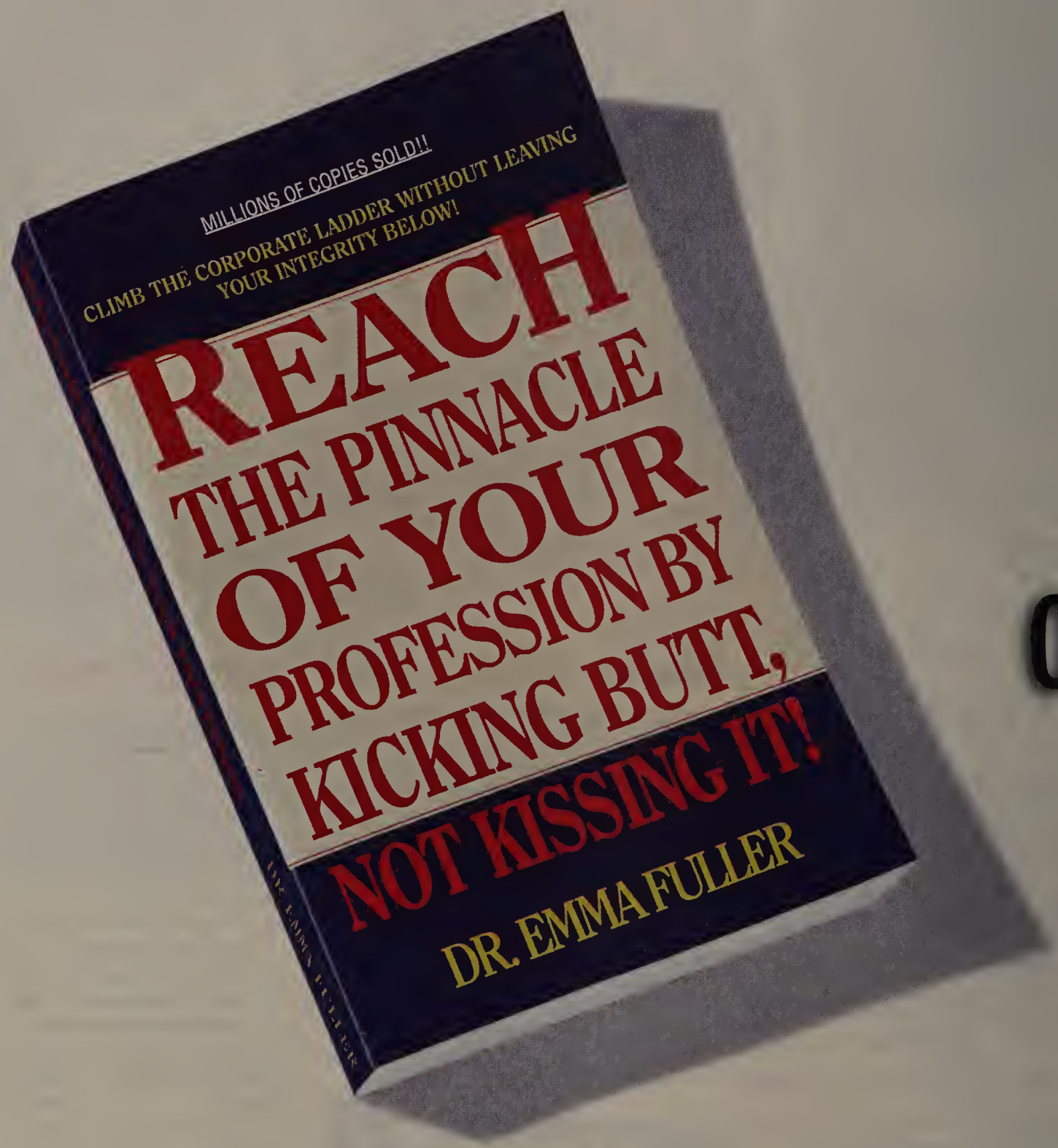

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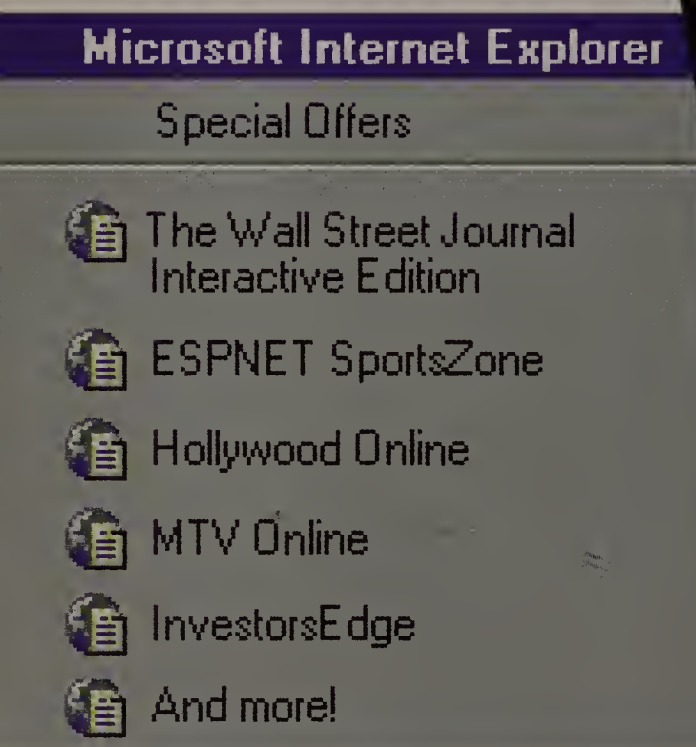
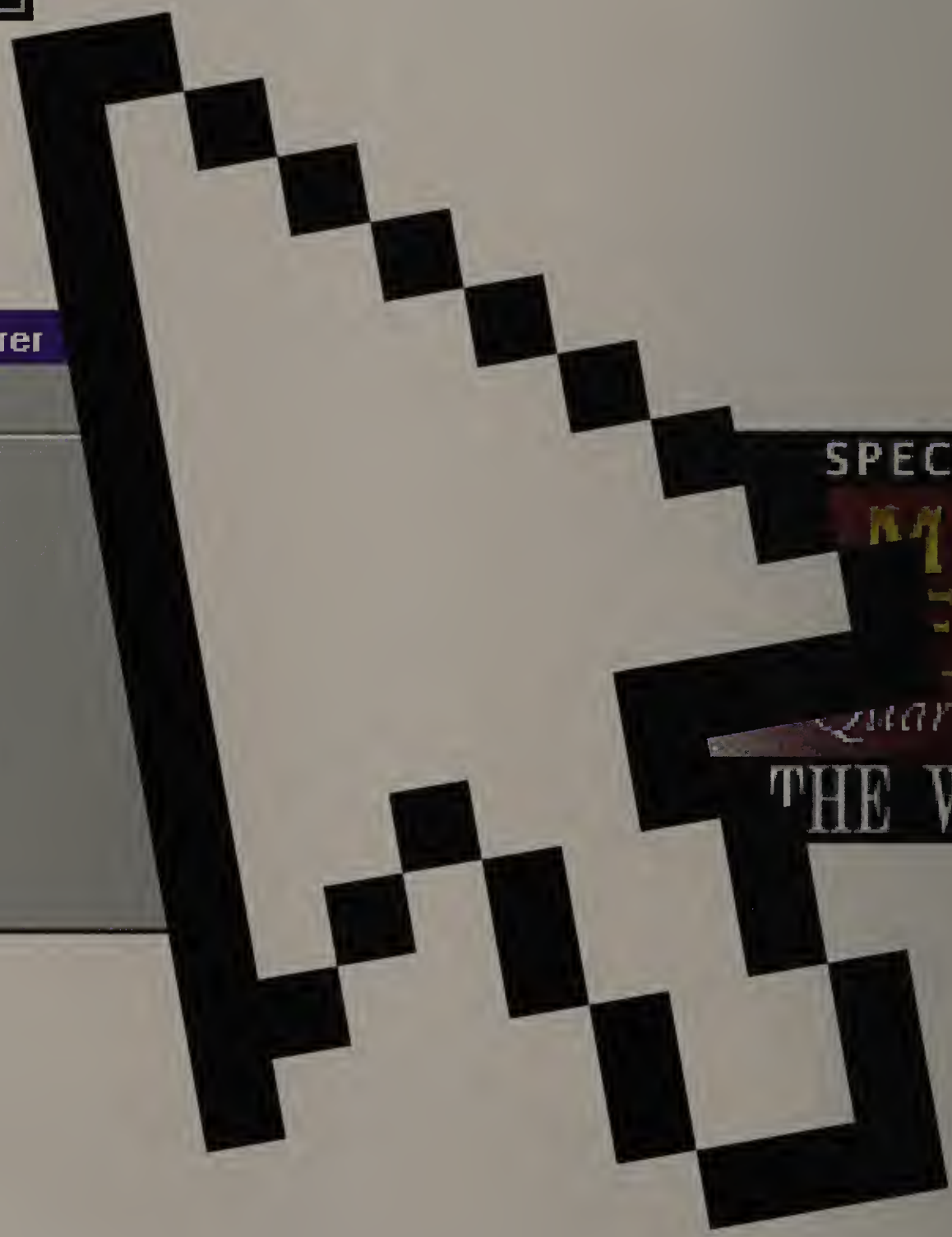
Microsoft Internet Explorer 3.0

Microsoft Internet Explorer





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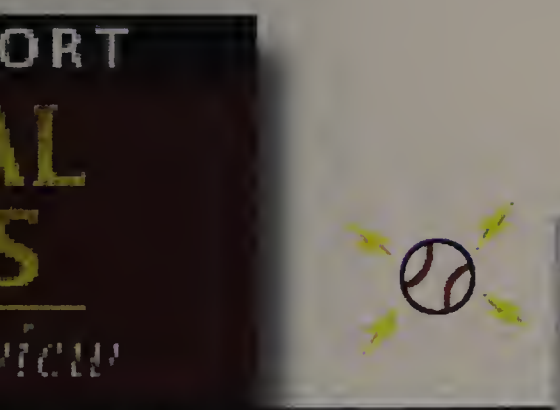

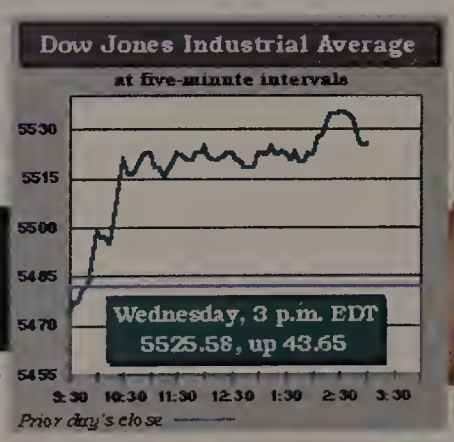

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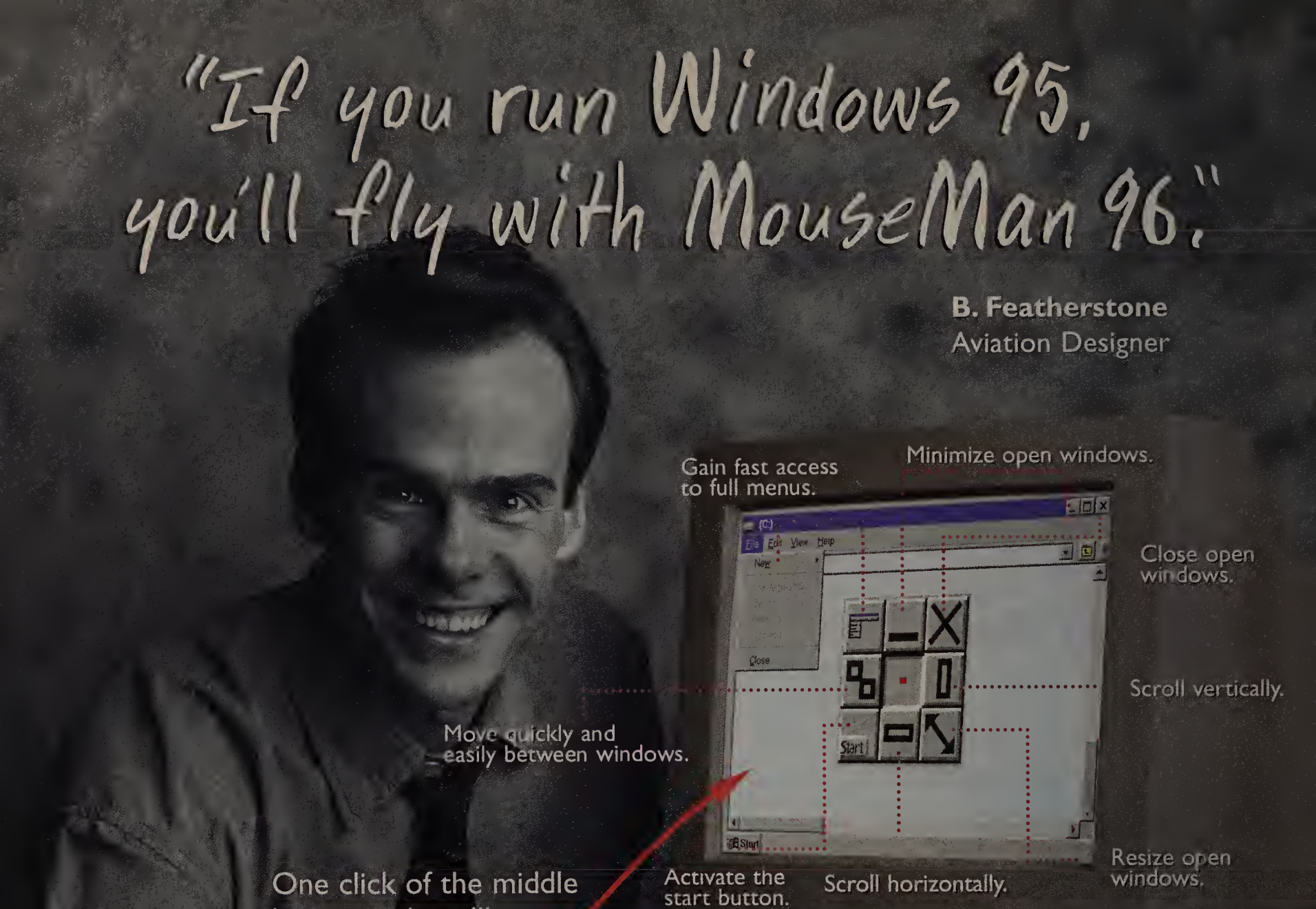

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LOGITECH

Products people love

Used Parts in Your New PC, Take 2

ILLUSTRATION: JOYCE HESSELBERTH

TODD FRENCH WAS in the market for a new computer. After reading *PC World*'s June article "How New Is Your New PC?" about companies putting used parts into computers sold as new, the copier repair person from Columbus, Ohio, decided to ask a number of vendors about their practices. It was a great idea, but after just a few calls, French realized he wasn't going to get useful information.

"No one will talk about it," says French. "The sales representatives say they aren't allowed to discuss the issue and won't answer any further questions on the subject." He notes sarcastically, "It really engenders a lot of faith on my part when the sales rep isn't allowed to explain the company's stance on the subject."

With a few exceptions, it's almost impossible to find out for certain if your new PC includes used components. Only a few companies, such as Acer America and Packard Bell, disclose their practices in their warranty or product literature. As part of the settlement of a class action suit filed by owners of Packard Bell PCs last spring, the company started notifying consumers of its reuse of some components. Acer began including the information shortly thereafter "because we believe it is necessary to try to clearly communicate our policies to customers and make sure they understand the whole process," says Michael Culver, vice president and general manager of Acer's Consumer Division.

If consumers had their way, every company would have to disclose its practices. An overwhelming 98 percent of the 329 respondents to a PC World Online survey said PC manufacturers should be required to inform buyers when "new" computers include used parts.

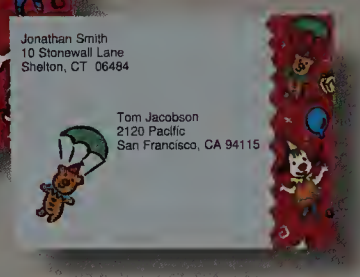
"Consumers have the right to know what they are paying for," says Allen Beal, a computer support specialist in Weymouth, Massachusetts. He believes strict guidelines should be established as to what constitutes a new PC and what defines a used one. Beal may get his wish, since both the Federal Trade Commission and numerous state attorney generals are reviewing the widespread practice of reusing parts from returned PCs in the assembly of new machines.

THE END IS NEAR

THE JOINT FEDERAL-STATE investigation was launched last spring after Compaq filed a lawsuit against Packard Bell alleging that the company took parts from returned PCs and installed them in PCs sold as new. Compaq blanketed all 50 state attorney generals with its original complaint, prompting various investigations. Although none of the 22 participating attorney generals will comment on which companies they are scrutinizing, one of the lead attorneys says the investigation is nearing its end.

"We're in the concluding stages now and are in discussions with the companies," says Todd Stone, an assistant attorney general for Florida, whose Ft. Lauderdale office is heading the investigation with Illinois. *Conclusion* in this case means either a settlement between the states and companies in question, or state lawsuits if the parties can't agree on a settlement.

Although state and federal investigators are tight-lipped about their inquiry, we do know ▶



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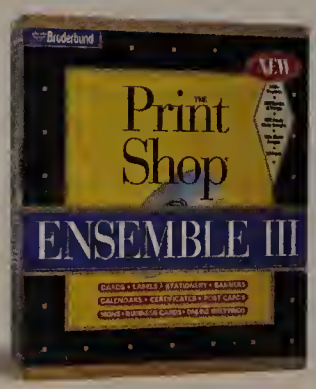

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that any guidelines resulting from the investigation will be binding for *all* PC manufacturers—not just those under scrutiny. The actual ruling should address one or more of several key concerns:

- presale notification that a PC includes used parts
- guidelines for the length of time a computer has been either running or in a consumer's hands before the parts can no longer be reused
- possible fines for manufacturers whose practices have been particularly egregious.

Over the years the Federal Trade Commission has issued several rulings about new parts and products versus used ones. In a 1969 advisory opinion, for example, the FTC declared that a simple electrical fuse had to be labeled as rebuilt or remanufactured if any component had been used before, even if all the components were tested and found to perform to the same standards as new ones.

State laws are not as clear-cut. Some states require manufacturers to label a product as used if any of its components are not brand-new. Others allow the products that consumers return unused to be resold as new.

None of these rulings or regulations deal specifically with personal computers, but it's likely that investigators will build upon existing guidelines.

WHO PAYS?

"IN A PERFECT WORLD, everything is brand-new, the latest design, and cheap," says Hank Borgman, a cash register mechanic in Farmington, Michigan. "But scrapping usable hardware to satisfy a dream of a perfect world would price computers beyond my reach." Borgman believes that manufacturers should be honest but says, "For my money, if the merchandise works as good as new, I am satisfied it *is* as good as new." He fears that the pending FTC guidelines would "ruin the most dynamic industry in the world today."

Computer support specialist Allen Beal is all for state or federal guidelines, but he also fears that consumers will pay in the long run. "Obviously the cost will be passed on to the consumer," says Beal. "The price of a new computer with certifiable new parts could essentially double. The customer still loses."

DON'T ASK, DON'T TELL

ALTHOUGH HE had little luck, Todd French was on the right track when he started asking companies about their assembly and manufacturing procedures. Companies need to be put on the alert that consumers care about how PCs are built—and that they'll make their purchasing decisions based not only on a company's practices but on its willingness to disclose those practices to current and potential customers.

If, as some companies claim, used parts are as good as new, why don't they disclose inclusion of used parts?

In our survey, 22 percent of respondents said they would buy a PC that included used parts. But just about everyone agreed that buyers have the right to be informed of a company's practices.

If, as some companies claim, used parts are as good as new, then why don't they disclose any inclusion of used parts? They could explain how products are tested and what the warranty covers, should something go wrong. Companies that refuse to provide that information run the risk of losing the trust of the customers that keep them in business.

Kathy Moriarty, a Gateway 2000 computer owner living in Dallas, believes it's time PC users started pushing for change. "Computer companies act as they do because they have been able to get away with it," says Moriarty. "Consumers have a responsibility to take a stand and demand proper service and products." ■

Are you aware of any used parts in your system? Send me your comments on the reuse of old parts in new computers or any other topic that you'd like to see covered in an upcoming Consumer Watch *column (consumerwatch@pcworld.com).*

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IDT's promises ◆ Sharp battery maintenance ◆ Positive action from Packard Bell

When Your Provider Doesn't Provide

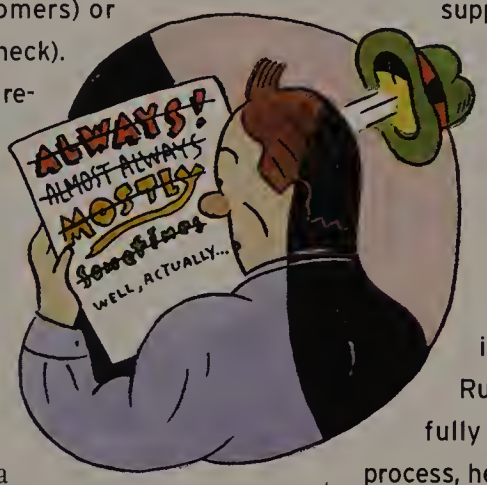
I WAS EXCITED to see an ad in *PC World* for IDT that said, "Always a local call." However, IDT told me local access would not be available in my remote area; I'd have to use toll-call access. The IDT spokesperson would not comment when I referred him to the ad. How can they advertise a service they have no intention of providing?

Norman H. Harrold, Glendale, Oregon

Editor's response: You're right, IDT can't claim to offer universal local service without delivering on its promise. However, the company has now modified its advertising to clarify that *most* calls—not all—are local.

In the last six months, *PCW Advocate* has received seven complaints about IDT's services—more than for any other Internet service provider. The reported problems include billing after cancellation, inability to reach a "live" representative, and log-on difficulties. According to Jeff Parness, IDT's director of public relations, the staff at IDT has grown from 85 to 500 in less than a year, with the focus on providing customer support staff to handle these problems.

Customers who want to cancel service can call IDT customer service at 201/928-2999 (credit card customers) or 201/928-2960 (check). Or fax cancellation requests to IDT at 201/928-1057.



LOW-LIFE BATTERY

THE PC WORLD test results that showed long battery life for a Sharp laptop ["Pentium Power Play," February] played an important part in my decision to buy a Sharp PC-3050. Much to my disappointment, its battery ran a maximum of 1 hour, 40 minutes. The manual states that the battery should last about 3 hours when new. I took the laptop to an authorized Sharp service center, where I was told the charging unit was working fine. I contacted Sharp technical support and was told someone would call. To date I have called, written, and faxed Sharp nine times. No one has responded.

Larry Kennedy, Kaunakakai, Hawaii

Editor's response: We forwarded Kennedy's complaint to Sharp, and he received a new battery via overnight delivery. Matthew Runyan, a supervisor at Sharp's Customer Assistance Center, apologized for the delay in handling Kennedy's problem. He assured us that Sharp is constantly working to improve the support operation. (Sharp customer assistance, 800/237-4277; fax support, 708/378-9980.) Kennedy reports he is satisfied with this resolution and that the new battery is working fine.

Sharp tests all returned batteries and very often finds nothing wrong with them, reports Runyan. Some customers may not fully understand the recharging process, he suggests. He advises using the battery until it is completely drained, then recharging it to the maximum.

WORTH THE WAIT?

I AM EXTREMELY PLEASED with my new Packard Bell computer and the company's service. Soon after I set the system up, my kids accidentally activated a security function, denying me access to the computer. I contacted Packard Bell and was up and running again in 35 minutes. A week later I had a problem with the sound card, and the technician spent 30 minutes with me until it functioned again. He also sent me updated system disks and CDs in the mail. Bottom line: Although I waited on hold each time for 20 minutes, both calls were toll-free, and I think the service is great. I would buy this machine again.

Dan Farrell, Anaheim, California ■

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is an assistant editor for* PC World.

THE FINE PRINT

Beware of Hidden Extras

A $1250 price sounds great for a new PC. But don't jump on the phone too fast. Be prepared to find a discrepancy between what's advertised and what you ultimately pay. The small print on this AST ad states that the actual price for the Bravo LC may vary, depending on where you buy the PC. (AT Computer, a reseller in San Francisco, quotes $1299 for this model.) Also, don't assume the list price includes all the goodies shown in the glossy photo. So, what's not included for $1250? For starters, you don't get a monitor or keyboard. Expect to pay an extra $349 for a 14-inch monitor or $939 for a 17-inch model (both from NEC). Keyboards range from $49 (Keytronic) to $79 (Microsoft) and up.

Don't be caught off guard—read the fine print. At the time you place your order, confirm that the terrific price includes all the components you're looking for.

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Circle 158 on reader service card

Recall on U.S. Robotics modems ◆ Fix for Microsoft fax ◆ Better Windows 95 Backup

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Recall: U.S. Robotics Sportster

BUG You hook up your brand-new U.S. Robotics V.34 Sportster Data/Fax or V.34 Sportster Voice modem, log in to your favorite BBS, and start typing, only to find that the connection freezes for as long as a minute. File transfers, Web browsing, and automated log-ins aren't affected. The problem surfaces in "terminal mode," which involves typing into a non-WYSIWYG screen. Common activities in this mode include manual log-in (to CompuServe, for instance, for people who don't use WinCIM), BBS navigation, participation in online service chat rooms, and any operation that uses the Windows HyperTerminal. According to U.S. Robotics, the culprit is an intermittent timing problem in Sportster and Sportster Voice modems made after April 1996. The affected fax-modems have a supervisor date (the date of the firmware stored on the modem's ROM chip) of March 4, 1996; for voice modems, the affected supervisor dates are February 13, 1996, and March 20, 1996. To determine your modem's supervisor date, open a terminal-mode communications program such as the Quicklink II program that came with the modem, type **+++** to enter command mode, then **ati7**. The modem should display a screenful of configuration information, including the ROM supervisor date.

FIX As we went to press, U.S. Robotics was just starting an exchange program. Because the troublesome ROM chips are soldered onto the modem circuit boards, users can't upgrade the ROM chips themselves. To exchange a modem with the freezing problem, call U.S. Robotics customer support at 847/982-5151.

HOWEVER... Despite U.S. Robotics' official statement that only modems manufactured after April 1996 suffer from terminal-mode freezing, the problem may be more widespread: Numerous participants in the newsgroup comp.dcom.modems report that freezing occurs in some modems with earlier supervisor dates, and that they have received replacements from U.S. Robotics. One particularly dedicated champion of the beleaguered Sportster owner, Kenneth Chen, has set up a Web page documenting his and other users' tribulations (http://www.carabelli.com/dentist/lore/usrincident.html).

BUG GOT YOU DOWN?

FOUND A HARDWARE or software bug? Post your report on PC World Online, or send us e-mail at bugs@pcworld.com.

ICON: JEFFREY PELO

IN BRIEF

fdisk Follow-Up

Microsoft has released a patch for the fdisk problem reported here in August. It's a driver called Disk Type Specific Driver Update for Windows 95 (dsktsupd.exe), and you can download it from Microsoft's Web site (http://www.microsoft.com/windows/software/dskts.htm).

Windows 95 Backup is Back Up

The version of the Backup utility that shipped with Windows 95 wasn't as fast as it could have been, and it sometimes prevented users from restoring backup due to a spurious 'out of memory' error. The new and improved version of the Backup utility is available from Microsoft (http://www.microsoft.com/kb/deskapps/powerpt/q136603.htm).

MS Fax Cover Page Fix

If you use Windows 95's Exchange fax program and you back up your hard disk, you've probably wondered why you can't use fax cover pages, despite their presence right there in the Windows directory. What's going on? Backup utilities remove the Archive attribute from the .cpe files (the fax cover pages) in the Windows folder, which has rendered them "invisible" to Exchange. Microsoft has finally gotten around to fixing this Exchange oddity. You can download the patch from the company's Web site (http://www.microsoft.com/windows/software/coverpg.htm).

Macro Virus Strikes Microsoft Excel

BUG Although macro viruses that attack Word documents have existed for over a year, the first Excel macro virus didn't appear until this past July. Known as XM.Laroux, this "virus," just like the Word Concept macro, is a benign macro that replicates itself in documents without causing damage.

FIX Microsoft has posted detailed instructions for detecting and removing the virus from Excel documents (http://www.microsoft.com/msexcel/productinfo/vbavirus/emvolc.htm) and promised to post utilities to its Web site soon that let you remove macro viruses and inoculate your copy of Excel against future infection. You'll find that link in the online version of this column. You can find more information and fixes on McAfee Associates' site (http://www.mcafee.com/support/techdocs/vinfo/v_1493.html). If you use Norton AntiVirus, get cross-platform inoculation from Symantec's site (http://www.symantec.com). By the time you read this, most antivirus vendors may have released other anti-Laroux tools. ■

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TOP OF THE NEWS

How to Get What You Want in Your New PC

DID YOU KNOW? Manufacturers use stripped-down versions of brand-name sound and graphics boards. They also buy CD-ROM drives and hard disks from many sources for use in a single PC model. Our tests show these practices can affect system performance.

ILLUSTRATION: K. DANIEL CLARK

JUST IN

PC manufacturers regularly **swap parts** and use **slimmed-down components** to maintain profits and ensure supply. Vendors say it's just smart business, but **users need to be wary.**

CONSUMER ALERT

WHEN YOU BUY A PC, do you know what you're getting? Don't count on it. Even if you read reviews and do research, the way vendors build products makes it hard to know exactly what's inside. That's because they often replace key components with like products that they have determined offer equivalent performance, or they use stripped-down versions of brand-name retail parts such as graphics and sound boards. Vendors say these are sensible business practices that cut costs and ensure steady production rates. Some buyers say the actions are deceptive.

In fact, the use of substitute or custom parts is a common industry practice carried out by top-tier manufacturers and small direct-mail companies alike. Officials from more than a half-dozen personal computer companies, including Dell, Gateway, Micro Express, Micron, and NEC, readily admit they rely on multisourcing to ensure an adequate and steady supply of critical components. Virtually all these companies also use custom versions of brand-name peripherals in some models. However, not all these firms are comfortable discussing their practices. Both Gateway and IBM declined to comment for this story.

The practice of parts swapping has drawn the attention of the Federal Trade Commission. Michael Rose, a staff attorney in the FTC's regional office in Cleveland, said he had contacted PC owners "in regard to a computer made by one of the mail-order houses." Rose would not say whether the FTC is conducting an investigation.

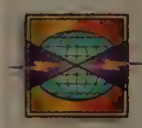
Vendors argue that using substitute or custom parts helps reduce system prices and prevent back orders while giving buyers equivalent performance and value. Moreover, failure to contract multiple sources can spell disaster for vendors. Scott Miller, senior industry analyst at research firm Dataquest, says Apple Computer lost millions of dollars in sales and crucial market share because it had no second source for components on high-end PowerMac systems. Of course, multisourcing also lets personal computer companies save a few bucks even as they exploit powerful brand names like Diamond Stealth and Creative Labs Sound Blaster.

PARTS SWAPPING AND SUBSTITUTION is perfectly legal, says lawyer Christopher Wolf. So buyers need to maintain their own due diligence when they purchase.

FULL DISCLOSURE?

ARE THESE business practices truly questionable? Christopher Wolf, a partner with the Washington, D.C., law firm Proskauer, Rose, Goetz, & Mendelsohn, LLT, says no. "Taken to its extreme, it certainly can be a consumer fraud issue," says Wolf. "But we haven't gotten to the point yet with respect to consumer electronics that the FDA is at [with ▶

I N T E R N E T



DON'T MISS THE latest news about computer products and industry developments that affect you. Find out what's happening today from PC World Online's Daily News Service (http://www.pcworld.com/news.html).

Windows 95 Misses Cyrix 6x86 CPU in Games

OWNERS OF PCs based on Cyrix's 6x86 processors have reported trouble running some popular games because Windows 95 fails to properly recognize the Cyrix 6x86 CPU. Users trying to play games such as Papyrus Nascar Racing or Psygnosis Assault Rigs may get error messages telling them they need a Pentium.

Larry Tittle, Cyrix technical support manager, calls the hitch a case of mistaken identity. At start-up, Windows 95 seeks to identify the system processor; but the only Cyrix chip known to the current version of the operating system is the company's 486-class processor. The result: Windows 95 games requiring Pentium performance think they are running on an underpowered 486 PC. Cyrix says the problem has not affected any business or productivity applications.

At press time, no fix was available from Cyrix. —*M. D.*

Faster Notebooks

INTEL HAS extended its line of notebook Pentium CPUs with a low-voltage 150-MHz processor. We tested a preproduction Micron Millennia Transport P150 based on this chip; Micron says shipping models should perform about the same as the unit we tested. It was the fastest notebook we've seen, but not by much. In *PC World* lab tests, the Micron P-150 with 32MB of RAM was only about 7 percent faster than the quickest P-133 notebook we've tested, which had 24MB of ▶

EDITED BY
Russell Glitman and Randy Ross

ICONS: JEFFREY PELO; PHOTO: WALTER CALAHAN

TEST REPORT

Not All 8X Drives Are Created Equal

Among Multisourced Components, CD-ROM Drives Show the Greatest Performance Differences

HOW WE TEST We tested 8X CD-ROM drives on a Gateway P5-166XL with 16MB of RAM and Windows 95. The following tests were run at 1024 by 768 at 256 colors: PowerFinder PhoneDisc 96 timed name search, Microsoft Encarta 96 script, and MindScape CyberSpeed game installation. We also ran a 98-image slide show in Corel PhotoLab and ran the CD-Tach low-level CD-ROM benchmark utility. Results shown are in minutes, with lower values representing better performance. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

food], where you have to disclose the fat content."

To protect themselves, PC companies keep their advertisements vague—to the point that it is difficult to know what is inside the system. Top-tier vendors like Compaq, Dell, and Micron advertise components with unrevealing descriptions such as "STB 2MB DRAM" or "Diamond Stealth 2MB DRAM." In some cases, readers see only the most basic information. An ad for an Austin PowerPlus 100 system in the August issue of *PC World*, for example, lists an "8X IDE CD-ROM Drive," and a "64-bit PCI Video Accelerator—2MB DRAM."

But our testing shows that parts substitution can affect system performance and capabilities. In our benchmark tests, overall performance of supposedly equivalent 8X CD-ROM drives varied by almost 30 percent. We also found that some custom OEM graphics boards support only lower refresh rates, which can cause screen flicker at high resolutions. (Original equipment manufacturer components are versions of retail products that are built specifically for computer makers.)

The advice for buyers: Ask lots of questions. Get specific information about key components and how their features and software compare to those of retail products. Also confirm which CD-ROM and hard drive models will be used in the PC, and specify what you want via fax so you have a record. Of course, a written quote from the vendor never hurts. (See "How to Get What You Want.") Warns John Antonchik, marketing director for Mitsumi Electronics, a major CD-ROM drive maker: "What the computer companies want is the cheapest possible solution that does the job. That may not be the same criterion an end user has."

A QUESTION OF SURVIVAL

MULTISOURCING, or parts substitution, is an almost universal practice among PC makers. The vendors contract

Tips for Getting What You Want

WHAT CAN YOU DO to protect yourself? These tips should help you get what you pay for.

Don't trust advertisements blindly. Because many ads are written 30 to 60 days before they appear, they're often vague about details. Of course, configurations may change without notice.

Don't assume too much. Graphics boards and sound cards listed in an ad may not be identical to retail versions, so confirm key specifications. For graphics boards, get specifics on the availability of upgrades to memory and features, as well as the speed of the RAMDAC chip that determines refresh rates. For sound boards, ask if the board includes a CD-ROM drive interface and an amplifier for driving unpowered speakers. Also inquire about bundled software.

Ask about multisourced components. If you think a Hitachi 6X drive is better than its Sanyo 6X replacement, request the Hitachi unit—and confirm that you will receive it. Our suggestion: Specify the desired component models in a faxed order.

Be wary of brand-new technologies. When 6X CD-ROM drives first came out, tight supplies forced system vendors to buy them where they could, and performance varied widely.

Seek opinions. Visit the online forums for the system vendors you want to buy from, and find out if owners are experiencing problems.

Go to the top. Our calls to PC companies' sales lines revealed that many representatives were unable or unwilling to provide specific component information. If you can't get straight answers, ask to speak to a manager.

WHEN IS A DELL NOT A DELL? When Howard Osgood needed his Dell monitor serviced, he discovered it was built by another company.

with multiple manufacturers of a single component to ensure supply. The use of multiple models is particularly common with storage devices such as CD-ROM drives and hard disks, though PC companies also frequently sell monitors built by other manufacturers under their own brand name. For example, Dell-brand monitors are built by Mitsubishi, Samsung, and Sony.

PC makers live and die by multisourcing. "Parts ordering in the PC business is one of the most critical issues when it comes to the company's ultimate bottom line," explains David Kaye, spokesperson for system maker Micro Express. "Sometimes [multisourcing is done] for availability, sometimes a manufacturer will give us a particularly good deal."

Some users are unhappy about the practice. Howard Osgood, an equipment technician with AAI Engineering Support in El Paso, Texas, calls the practice "the AMC Jeep philosophy." Osgood, who struggled to get Dell Computer to fix an older Dell monitor built by Royal Computer, explains: "You'll have a transmission of one sort in one vehicle, and another from a different manufacturer in the next."

What constitutes an equivalent component? That decision is left entirely to the vendors, who may ink deals with two, three, or more suppliers of a critical part. All the companies that we talked to say they test components rigorously to ensure that alternative components are up to the company's own specifications, often employing publicly available benchmarks as well as custom tests.

What constitutes an equivalent component? That decision is left entirely to vendors, who may ink deals with many suppliers.

Our tests show that multisourcing can affect performance. We compared the performance of five popular OEM 8X CD-ROM drives, including the Toshiba 5602 and Wearnes CDD-820 units that have appeared in Gateway's Pentium PCs and other models. The Wearnes CDD-820 was by far the slowest in the group, performing almost 30 percent slower than the fastest drive, the Teac CD-58E. The next slowest drive, Toshiba's 5602, was only 10 percent slower than the Teac. The difference among tested 1.6GB hard disks was smaller. The slowest drive tested—Hewlett-Packard's SureStore 1600A—was about 6 percent slower than the swiftest unit, Western Digital's Caviar 31600.

PARTS IN FLUX

DESPITE THE INDUSTRY'S reliance on parts substitution, buyers remain uninformed about the practice. System vendors don't announce when they swap in a second-source CD-ROM drive or other component. Even if companies did disclose the practice, buyers would have difficulty keeping track, since the mix of components can be in constant flux. "It can change sometimes from hour to hour," says Micro Express's Kaye. "But typically it changes day to day."

Dell representative Denise Klapperich says that the hard drives inside Dell systems may change without notice. "On some models, it would simply depend on what we have in the warehouse at that time. We consider them of equal value and performance."

Most magazine ads offer scant warning of this substitution practice, usually in the fine print. Dell Computer's advertisements in *PC World*, for example, include in very small type the information, "Prices and specifications valid in the U.S. only and subject to change without notice." Ads placed by Compaq, IBM, Micron, Gateway, and others include similar provisions.

The problem is, buyers make their de- ▶

RAM. (We'd expect configurations with the same amount of RAM to show even smaller performance differences.) —*A. B.*

Useful Netphones

EXISTING INTERNET phone software lets you make long-distance calls over the Internet for the price of a local call. But limitations abound: For one, you can call only other PCs. But now IDT and VocalTec have announced services that let your PC call a traditional phone over the Internet. There's a small charge, but rates are still cheaper than current phone company rates for international calls. —*R. O.*

AOL Revamps

AT PRESS TIME, America Online was about to release the Windows 95 version of its software. The new software's components-based architecture lets AOL upgrade the program piece by piece. The design allows for shorter, less-intrusive updates than past revisions, which required users to download an entire new version. This version uses Microsoft's Internet Explorer 3.0 engine as its browser but retains the drab AOL browser interface. This fall AOL will upgrade its mail and Web search features. —*G. M.*

Faster CD-ROM Drives

COPY PROTECTION and licensing issues have delayed production of DVD-ROM drives, extending the life of traditional CD-ROM drives. Vendors are ▶

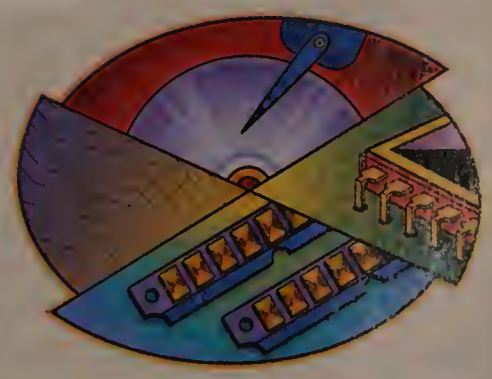


PHOTO: SEAN JUSTICE/SWANSTOCK; ILLUSTRATION: JEFFREY PELO

cisions based on reviews of systems with specific configurations. *PC World* often publishes model information about the hard disks and CD-ROM drives found inside reviewed systems. However, most ads reveal only capacity or spin speed and not the name of the manufacturer or model. Buyers, meanwhile, may expect to receive the components they read about in a published review.

"Where we run into that situation the most," says Kaye, "is when customers call [as a result of] a review in a magazine. Micro Express, like most companies, has multiple vendors for virtually every component in a PC. So if a system is reviewed, the configuration that is reviewed may not be identical to the configuration that the reader may buy."

Which Part Will You Get? Vendors Use Many Suppliers

SYSTEMS	Hard disk	CD-ROM drive	15-inch monitor	17-inch monitor
Dell Dimension XPS P166c	Quantum Fireball Seagate Western Digital Caviar	Sony	LightOn or Sony	Samsung or Sony
Gateway P5-166 Professional	Quantum Fireball Western Digital Caviar	Panasonic Toshiba Wearnes	Sony	Magnavision or Sony
IBM Aptiva c67	Maxtor Western Digital Caviar	unknown	IBM with Sony tube	IBM with Sony tube
Micro Express MicroFlex PCI-166	Quantum Fireball Western Digital Caviar	Samsung Teac Toshiba	sold separately	sold separately
Micron P166 Millennia	Conner Western Digital Fireball	Hitachi	ADI	MAG
NEC PowerMate VE	Western Digital Caviar	NEC MultiSpin	sold separately	sold separately

Source: Vendor sales lines as of July 31, 1996

CUTTING COSTS

BUYERS MUST ALSO be on the lookout for systems with slimmed-down versions of retail parts.To nail down lucrative OEM contracts, component makers customize products to shave pennies off the cost. For their OEM products, graphics board companies such as Diamond, Matrox, and STB may use a slower RAMDAC—the chip that determines how often the board can refresh the image on the display. So while the Diamond Stealth64 Video 3400 and the Matrox Millennium feature a 220-MHz RAMDAC supporting 75 Hz and faster refresh at 1280 by 1024 resolution, some OEM versions of these boards use a 175-MHz RAMDAC that can manage only 60 Hz at the same setting. The screen flicker from that lower fresh rate may result in headaches and eyestrain. To save money, manufacturers may also limit upgrade options for memory and multimedia. Some OEM versions of STB Systems' flagship LightSpeed 128 board do not accept memory upgrades, while some of the Matrox Millennium boards found in PCs from NEC and others do not accept MPEG upgrade modules available for the retail product.

> The **configuration** of the system **that's reviewed** may not be identical to the **configuration** of the system that the **reader buys.**

Similarly, sound board makers may strip features to suit the system manufacturers' design or pricing needs. Creative Labs sells OEM versions of the Sound Blaster 16 board that lack both an Enhanced-IDE connection for CD-ROM drives and an amplifier for driving unpowered speakers. Speaker vendor Altec Lansing also builds OEM versions of its retail products with cost-saving design tweaks such as slimmed-down profiles and fewer connectors.

OEM versions of these products may also have little or none of the bundled software found in the retail version. For instance, the Matrox Millennium graphics card retail package includes the Multimedia SuperPack CD-ROM containing games and software, but the OEM Millennium board often lacks the disc. Likewise, Creative Labs does not include the VoiceAssist and TextAssist applications with the OEM versions of its Sound Blaster 16 board.

PC and component vendors alike say that this slim-down practice does not substantially affect performance, a claim our tests confirmed. We put a Gateway system's OEM version of the Matrox Millennium 2MB graphics card through the PC WorldBench test suite along with the retail Millennium card, and found virtually no difference in overall performance. That result is not surprising, since no changes were made to the graphics accelerator chip that largely determines performance. Likewise, the retail and OEM versions of the Creative Labs Sound Blaster 16 provided virtually identical audio fidelity in our tests on an Audio Precision System Two test bench.

Unless the FTC adopts more rigorous standards for disclosing what components are sold inside PCs, consumers face an uncertain buying landscape. After all, vendors will do what it takes to maximize their profit. "The fine print provides some protection, sure," says Christopher Wolf. "But when you make the actual purchase, you have the right to ask and be told the truth."

—Michael Desmond ■

Application Suites Abandon One-Size-Fits-All for Custom Tailoring

FIRST LOOK

YOU WOULDN'T like a one-size-fits-all wardrobe, yet you probably use a huge ready-made application suite from Microsoft, Lotus, or Corel without much complaint. Until now, all three firms built enormous suites that had little room for tailoring. All that's changing: The application suites of 1997 are designed to be customized for any given project or work style.

The change will begin in November, when Microsoft and Lotus are expected to ship new versions of their suites. Both will be notable for the choices and substantial control they offer.

Microsoft will offer at least three flavors of Office 97, including Standard, Professional, and Small Business. Suites from Microsoft and Lotus will expand your options for organizing work, getting online help, sharing information, and using the Internet. And both suites will let you add applets, also known as components. These small, focused applications let you perform tasks such as creating a chart. Corel, however, may be the most ambitious of the trio. It's working on a new kind of suite—five applets that run on Java. Code-named Corel OfficeJV, the suite should ship in February 1997. It will not replace WordPerfect Suite 7.

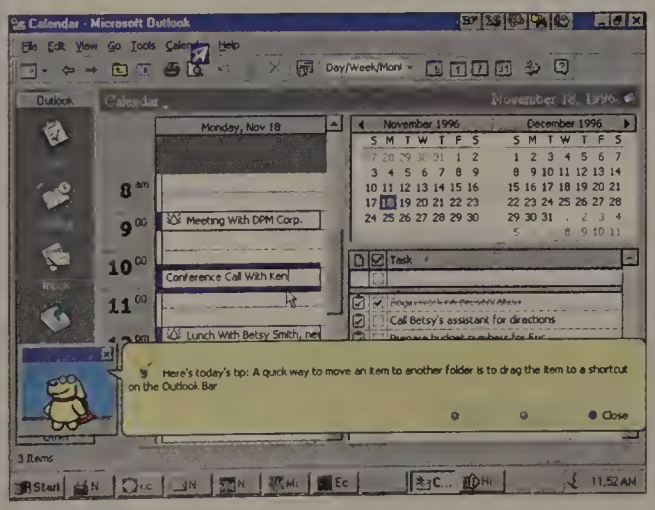
Here's a sneak peek at Microsoft Office 97, Lotus SmartSuite 97, and Corel OfficeJV, based on alpha versions and demos.

MICROSOFT OFFICE 97

MOST OF YOU already own an application suite, and it's likely to be Office. Now Microsoft's challenge is to maintain its position. "If there's one thing that keeps Bill Gates up at night, it's how to keep people buying Microsoft Office upgrades," says Jeff Tarter, editor of *Soft-Letter*. "That's Microsoft's cash cow. They're going to try a little of everything."

This fall you will have many new choices. First off, you'll be picking from three or possibly four versions of Office. The Standard edition will provide new versions of Word, Excel, PowerPoint, Internet Explorer, and Outlook—a "desktop information manager" (Microsoft's name for a fancy personal information manager). An Office Professional version will also include Access. A Small Business version will probably swap PowerPoint and Access for Microsoft Publisher and a mapping program. There may also be a fourth version that bundles software development tools. The final mix in each suite was not set at press time.

The best part of Office 97 may be its new usability and help features. When you have a question, you don't have to scroll through a Help menu index. Just ask your Office Assistant—an animated on-screen helper that answers questions and gives tips. If you're doing a task inefficiently, the Assistant may pop up with a tip. If you don't like the Assistant, you can turn it off.



YOUR NEW OUTLOOK: An animated assistant helps out in Office 97's Outlook, a new PIM and scheduler.

Microsoft has also improved its natural-language technology. When you have a question, you ask your Assistant by typing a query, such as, "How do I get rid of tabs?" (Office 95 had some of this technology, but Office 97 is more versatile.) Also new is the Command Bar, a kind of toolbar that lets ▶

rushing to produce 12X CD-ROM models and beyond. Mitsumi, Toshiba, and Wearnes plan to introduce 12X drives this fall. —*M. D.*

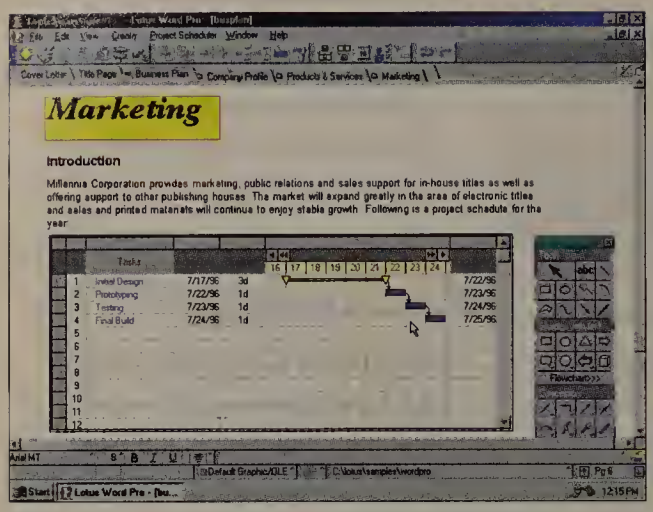
Crisper Images, Better Battery Life

NEOMAGIC'S MagicGraph128 flat-panel graphics accelerator is designed to improve notebook display quality while using less power than past notebook chips. The device draws as little as 3.3 volts and packs DRAM and logic into a single chip. Look for it in notebooks this fall. —*G. M.*

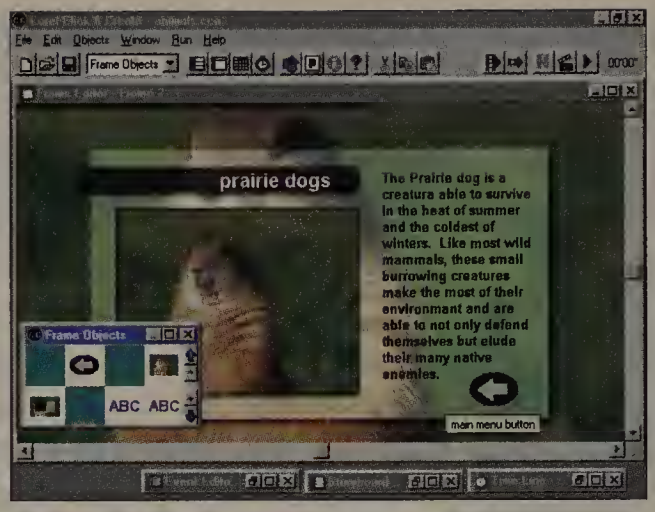
TidBytes

Handheld Fax Machine: Reflection Technology is shipping a $299 device that lets you receive, view, forward, and, with some effort, send faxes from just about anywhere. The device, about the size of a TV remote control, attaches to either a data-compatible cell phone or a standard phone jack. The phone in turn connects to a PC. To read a fax, hold the device up to your eyes and look in the 2-inch-wide window. **Design a survey:** Create a statistically valid survey with Autodata Systems' $245 Survey. Developed for nonexperts, it includes sample surveys plus tabulation and analyzing features. (Autodata is at 800/662-2192.) **Updated PDA:** Hewlett-Packard's new $399 OmniGo 120 Organizer Plus uses Motorola's holographic technology to make the screen of this wallet-size organizer look brighter than the previous model's. ■

ILLUSTRATION, ABOVE LEFT: DOUG ROSS; RIGHT: JEFFREY PELO



LOTUS WORD PRO 97: SmartSuite 97's new word processor works with Lotus Components.



A JAVA SUITE: Corel OfficeJV delivers a mix of five applications that run under Java.

you drag and drop commands from the drop-down menus onto one bar.

Office has never had a really good PIM or scheduler, but Microsoft is trying to fix that with Outlook—a program that combines personal and workgroup scheduling, contact and task management, and document sharing features in one place. No more flipping between applications to find pieces of related information.

Outlook is very customizable, offering five views (table, calendar, card, icon, and timeline) in which you can present personal information. The Journal feature tracks work you do in Office applications so you can keep records for billing purposes, or find the file you created last Monday even if you can't remember its name. With Outlook's Categories feature, you can tag any piece of information with a keyword, such as "potential customer." Then you can sort e-mail, tasks, appointments, and documents by keyword. Outlook also offers a Voting feature that polls people with a multiple-choice question and tracks the results. It's compatible with Schedule+ for group scheduling and integrates with any MAPI-compliant e-mail package. Unfortunately, Outlook has so many features, it's harder to learn and use than traditional PIMs, based on our experience with this beta portion of the suite.

OfficeArt, an easy-to-use addition to Office, is a draw module that works in Word, Excel, and PowerPoint. If you're ham-fisted with freehand draw tools, you're in luck: From a library of shapes, you can select one to paste into your document, where you then size or rotate it or apply 3-D effects. OfficeArt also includes special effects for text. Throughout Office 97, you can save documents in HTML format, assign hyperlinks, and use Internet Explorer to view Office documents.

Office 97 also supports ActiveX applets. Microsoft offers a few applets from its Web site now, such as the PowerPoint animation player.

LOTUS SMARTSUITE 97

THROUGHOUT Lotus SmartSuite 97, you will find new workgroup and Internet features. Lotus, like Microsoft, is trying to give you a seamless path between your suite and the Web.

Like Microsoft, Lotus is also building components. They currently work best with Lotus products, but Lotus plans to integrate them with third-party products such as Web browsers. We were impressed by a demonstration of the Lotus Components Starter Pack. It includes six applets: spreadsheet, charting, file viewer, draw, comment (adds Post-it–type notes to documents), and project scheduling. These applets work with Lotus ▶

FEATURES COMPARISON 1997 SOFTWARE SUITES

	Expected ship date	Basic applications	Key features	Estimated pricing
Microsoft Office 97	November 1996	Word, Excel, PowerPoint, Outlook, and Internet Explorer; Professional version adds Access; Small Business version adds Publisher	● Outlook personal information manager-scheduler ● Assistant animated help ● Office Art graphics tools ● HTML publishing ● support for ActiveX applets from Microsoft and third-party vendors	$449, Professional version $549, competitive upgrade $249, upgrade from Office 95 $209, price for Small Business version not available
Lotus SmartSuite 97	November 1996	Word Pro, Approach, Freelance, and ScreenCam, 32-bit versions of 1-2-3 and Organizer	● major revamp of 1-2-3 ● better Word Pro performance ● HTML publishing ● organized area for storing information from Internet ● support for ActiveX applets for Word Pro from Lotus and third-party vendors	$399, competitive upgrade $149, price for upgrade from SmartSuite 96 not available
Corel OfficeJV	February 1997	five Java applets: word processing, spreadsheet, charting, drawing, and presentation	● smaller alternative to WordPerfect Suite 7 ● runs on cross-platform networks ● also designed for Internet PCs ● will sell through retail and the Web ● open to third-party Java developers	less than $269, competitive upgrade $99, applets may be sold separately

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Notes, but the real news is that they'll also work with Word Pro 97. That compatibility opens up SmartSuite 97 to developers, who'll be able to write ActiveX applets that work within Word Pro much as Lotus components do. You can download a free trial version of two of the components (http://www.lotus.com). The full pack costs $49.

Sources at Lotus say the company will likely ship another set of components before year-end. It's also working on a Java version that will let you run components from inside your suite applications and your browser.

COREL OFFICEJV

COREL HAS already released its full-size suite, WordPerfect Suite 7, which earned a Best Buy in our September issue (see "Software Suites: Corel Takes On Microsoft and Lotus"). Now Corel is working on a new kind of suite—a group of five applets that run under Java and Java-enabled browsers such as Netscape Navigator. Corel OfficeJV will include word processing, spreadsheet, charting, drawing, and presentation applets. This tiny suite takes about 620K of disk space. It will also integrate with future Java applets from Corel or others.

Corel is working on a new kind of suite—a group of five applets that run under Java and Java-enabled browsers.

The applets looked quite good in the demonstration we saw. Corel has based the word processing and spreadsheet applets on WordPerfect and Quattro Pro, stripping out the less frequently used features. The suite interface resembles Windows 95, and a handy toolbar lets you stash notes and templates in folders.

SUITABLE SUITES?

AT FIRST GLANCE, Office 97 and SmartSuite 97 have promising suite-level improvements, while Corel offers an innovative option. As betas arrive, we'll report on them. Stay tuned.

–Laurianne McLaughlin ■

Corel OfficeJV

PROS: Functionality for many jobs, interface looks good, useful for upcoming network computers.
CONS: You can't please everyone in 620K.
VALUE: Too soon to tell.
Estimated price: less than $269
Corel, 800/772-6735
http://www.corel.com
READER SERVICE NO. 815

Lotus SmartSuite 97

PROS: New versions of 1-2-3 and Word Pro
CONS: Organizer barely changed.
VALUE: Too soon to tell.
Estimated price: $399
Lotus Development,
800/828-7086
http://www.lotus.com
READER SERVICE NO. 816

Microsoft Office 97

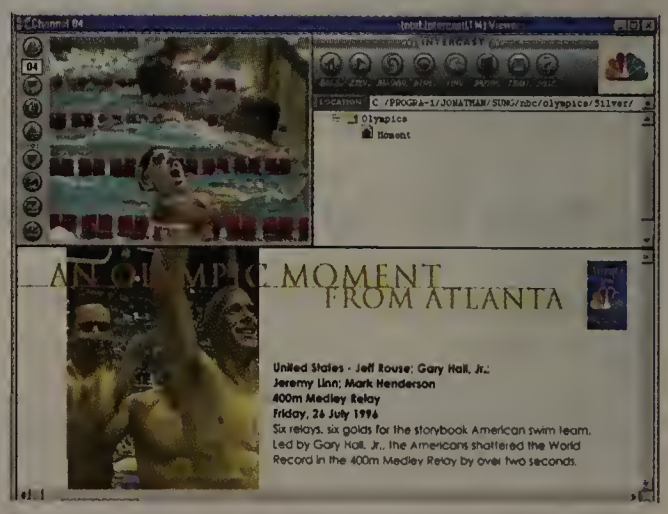
PROS: Help features and Office Art graphics tool.
CONS: Outlook may be tricky to learn.
VALUE: Too soon to tell.
Estimated price: $449
Microsoft, 800/426-9400
http://www.microsoft.com
READER SERVICE NO. 817

Broadcasters Use TV Signals to Send Data

PCS AND TVS are converging. Recently introduced products use TV signals to send data to personal computers equipped with television tuners. Broadcasters can enhance shows with related Web links, financial data, and software demos.

This new technology is already available. How does it work? In one variation, you watch a televised baseball game in one window and Web pages with the players' statistics in another. To transmit this information, broadcasters use a portion of the television signal. To receive the data, you need a television add-in board and software, which together cost less than $150. Broadcasters currently do not charge extra for this service.

Intel and a host of PC and media companies are championing Intercast, one approach to combining video and data broadcasts. At press time, NBC was using Intercast to broadcast data on Olympic events, providing related Web pages and links. I saw a sample and found that glancing away from the video to read the Web pages became a little tedious. Watching a news show that included related Web pages would probably be more useful and less distracting. For faster-paced events such as basketball games, the split-screen approach may be less practical. This fall some episodes of the NBC *Homicide* series may include Web pages containing clues for solving crimes that are depicted on the show. Both CNN and QVC already offer the mixed data-and-television broadcasting, while MTV plans to make the technology available later this year. On the hardware end, Hauppauge Computer Works is shipping the WinCast/TV Intercast PCI add-in card for $149. AST and Compaq plan to ship systems bundled with an Intercast card before the end of the year. **–Randy Ross** ■



INTERCAST TECHNOLOGY lets you view TV in a corner of a PC screen and related Web pages below.

ILLUSTRATION: DOUG ROSS

www.winthis.com

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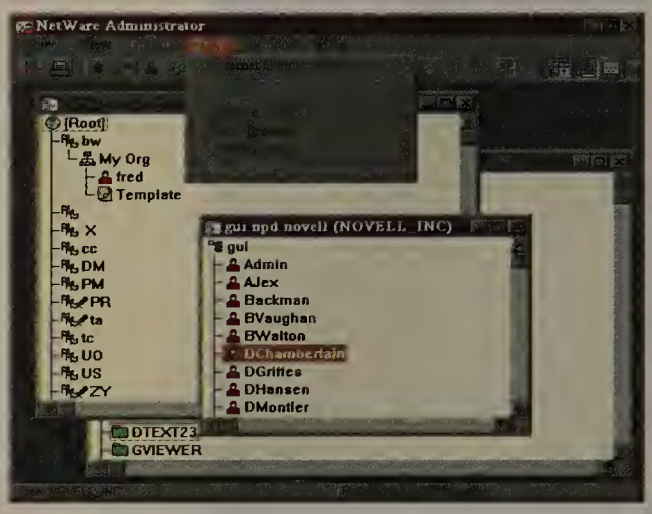
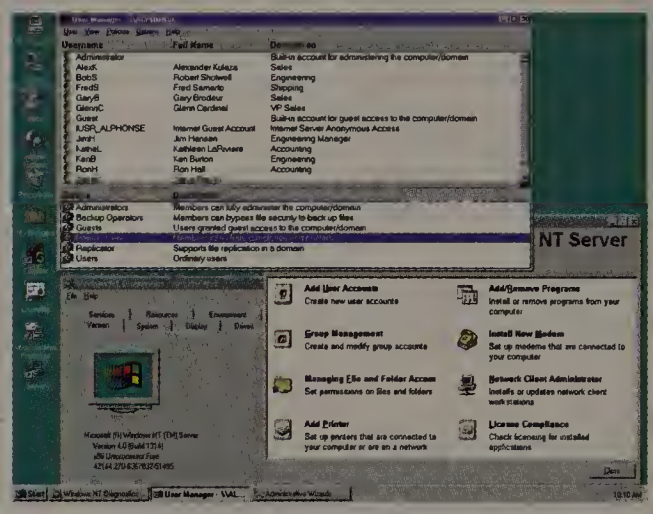
Upgrades to NT Server and Netware Include Web Setup Features

NETWORKS

NOVELL AND MICROSOFT are vying for the hearts and wallets of LAN managers and PC users with upgrades to NetWare and NT Server—the two leading network operating systems for larger organizations. Both products offer new features for companies that want to set up their own Web sites. Windows NT Server 4.0 is a major upgrade that retains the ease of installation and use of its predecessor. NetWare 4.11 is more of an incremental upgrade, but it extends its high-powered administration features while bundling a few new goodies. We looked at prerelease versions of both products. (For a look at IBM's OS/2 Warp Server 4, see "IBM Makes LANs Easier," *Top of the News*, August.)



SPRUCED UP: The new interface in NetWare 4.11 provides easy access to administrative tools.



WIZARD WATCH: NT Server 4.0's Administrative Wizards make managing your LAN a breeze.

THE BETTER BUNDLE: NT SERVER

MICROSOFT BUNDLES its new Internet Information Server 2.0 with NT Server 4.0, while NetWare 4.11 incorporates Novell's NetWare Web Server 2.5, which previously sold separately for $995. Both products include tools for creating and maintaining Web sites. But NT Server has the advantage here: Its WYSIWYG FrontPage 1.1 is much easier to use than NetWare 4.11's tools, which require familiarity with BASIC. Mark Dieckmann, systems advisor for Anadarko Petroleum in Houston, Texas, selected NT Server for the company's 700-user local area network. Dieckmann says the product's built-in Internet server and utilities are so easy to use, Anadarko is considering its own intranet—an internal Web site that lets employees use a browser to tap into corporate data.

NT Server 4.0 also has extensive features for employees who need remote LAN access. The built-in Remote Access Server has been enhanced to increase the performance of dial-up connections and allow secure remote access through the Internet. (Companies save on long-distance charges because employees can access the LAN via a local call to an Internet service provider.) While OS/2 Warp Server 4 includes some remote access features, NetWare 4.11 doesn't have built-in remote access. However, add-on remote access products range from limited-feature software for a couple of hundred dollars to hardware-based products that cost thousands of dollars.

EASIER INSTALLATION: NT SERVER

NT SERVER 4.0 is surprisingly easy to install and manage. Experienced PC users should be able to run a small or medium-size local area network without a full-time network person on staff. NetWare, on the other hand, has always been known for its thorny installation. NetWare 4.11 is supposed to address this issue with automatic sensing of add-in cards and automatic installation of NetWare software drivers. Unfortunately, these features were not available in the prerelease version we looked at, and even if they work as outlined, setup will still be tricky. And while managing NetWare 4.11 is easier with the new Windows-based administrative utility, that utility too is aimed at experienced network managers.

THE NETWARE ADVANTAGE

THE PRODUCTS take very different approaches to handling large networks with multiple servers and locations. NetWare 4.11 uses the proven Novell Directory Services, which makes it easy for LAN managers to control many users and resources from one place. NT Server groups servers into "domains" that require more manage- ▶

LARGE LAN: With a network of 350 servers and 6000 users, LAN administrator Curtis Parker relies on Novell Directory Services.

PHOTO: RAVELL CALL

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Circle 173 on reader service card

ment. To simplify matters, Microsoft offers the Systems Management Server, part of the company's BackOffice, which has more sophisticated—albeit expensive—network management tools, starting at about $717 per server license. NDS makes a difference to Curtis Parker, LAN administrator for the state of Utah. Parker, who manages 350 file servers and nearly 6000 users, says, "The benefits of NDS will keep us from replacing NetWare with NT."

With NT Server 4.0, Microsoft has done a great job of creating a full-featured product for small and medium-size firms that are either just getting connected or want to move up to a full-powered LAN with room to grow. For larger companies with multiple servers and locations, NetWare will remain the network operating system of choice, particularly for companies whose LAN managers know the product. The benefits of 4.11 range from streamlined NDS tools to a long-awaited utility that makes upgrades simple while saving existing accounts and settings. These advances should convince managers of many NetWare sites that never upgraded to take the plunge. **–Anne Fischer Lent and Stan Miastkowski**

Lantastic 7.0, the latest version of the network for small businesses, includes Netscape Navigator 2.0, and an Internet gateway. Check out our review at http://www/pcworld.com/news/lantastic. ■

FEATURES COMPARISON

Pick the Right LAN Operating System for the Job

If your company is shopping for a LAN, you've got four solid choices. The more features the OS has, the more complex and expensive it is to set up and maintain. Buy wisely, and you'll save as your needs grow.

STANDARD FEATURES	Lantastic 7.0	NetWare 4.11	OS/2 Warp Server 4	Windows NT Server 4.0
Price for 10 clients and server	$499	$2495 [1]	$829	$1129
Optimum number of users	2 to 25	25 or more	25 or more	10 to 100
Requires full-time LAN manager	no	yes	not for smaller installations	not for smaller installations
Requires dedicated PC for server	no	yes	yes	yes
Expandability	limited	yes	yes [2]	limited
Types of applications supported	basic [3]	advanced [4]	advanced [4]	advanced [4]
Multiple-site management	no	yes	limited	limited

[1] For version 4.1; version 4.11 pricing unavailable. [2] Requires Warp Server Advanced 4. [3] E-mail, file and peripherals sharing. [4] Basic apps plus groupware, Web server, and transaction processing.

Windows NT Server 4.0

PROS: Extensive built-in features, installation and management don't require LAN expertise.

CONS: No easy-to-use tools for managing large networks.

VALUE: Solid choice for small and medium-size companies.

List price: 10 users $1129, upgrade $539

Microsoft, 800/426-9400

http://www.microsoft.com

READER SERVICE NO. 814

NetWare 4.11

PROS: Industry standard, best tools for managing far-flung servers on large networks.

CONS: Installation and management require technical expertise.

VALUE: For savvy LAN managers, remains the choice for large nets.

List price: not set at press time; version 4.1 $2495 for 10 users

Novell, 800/638-9273

http://www.novell.com

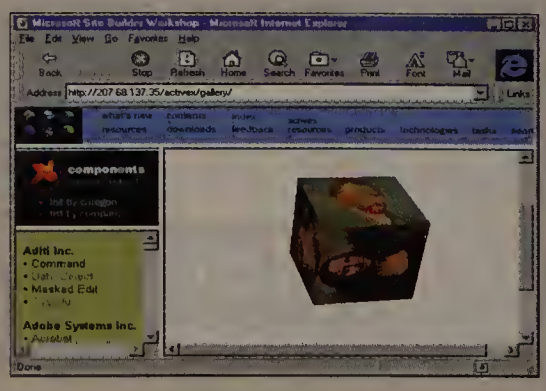
READER SERVICE NO. 815

WEB BROWSER

Getting Active on the Web

A WEB BROWSER is the Internet's meat and potatoes: It offers enough to sustain your information needs but little in the way of gastronomic delight. For a more epicurean experience, you need tools that enhance your browser. In the case of **Netscape Navigator,** plug-ins and helper apps such as Macromedia's Shockwave, Progressive's RealAudio, and Adobe's Acrobat are typical additions. Microsoft's **Internet Explorer 3.0,** however, uses **ActiveX controls** to enhance its functions.

Thousands of these tools, including ActiveX versions of popular Navigator plug-ins, are available on the World Wide Web. Here is a list of our favorites: **Shockwave,** Macromedia's popular animation and audio player (http://www.macromedia.com); **RealAudio,** Progressive's streamed real-time audio player (http://www.prognet.com); **Viscape,** a super-cool VRML (virtual reality) player by Superscape (http://www.superscape.com); **Texture,** for viewing pages created with FutureTense's breathtaking Java layout tools (http://www.futuretense.com); and **Acrobat,** the de facto standard for viewing cross-platform rich-text documents, including hypertext links (http://www.adobe.com).



FIND ACTIVEX CONTROLS like this Rotating Cube at Microsoft's Component Gallery.

These and other ActiveX controls also are at Microsoft's ActiveX Component Gallery site (http://207.68.137.35/activex/gallery). Some versions of Explorer 3.0 include these and many more controls. **–Yael Li-Ron**

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there was
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GATEWAY2000

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When patriots threw 342 chests of British tea into Boston Harbor on December 16, 1773, the ripples extended all the way to England. A small act of defiance, The Boston Tea Party nonetheless sent a big message to an absentee British ruler later indicted for having "plundered our seas, ravaged our coasts, burnt our towns and destroyed the lives of our people."

When two Midwestern farm boys created the first ever GATEWAY 2000® PC more than two centuries later, their defiance against high prices rumbled throughout an industry. It was the birth of the PC revolution.

Since then Gateway has held these truths to be self-evident: Customers deserve quality, value and the commitment of customer service.

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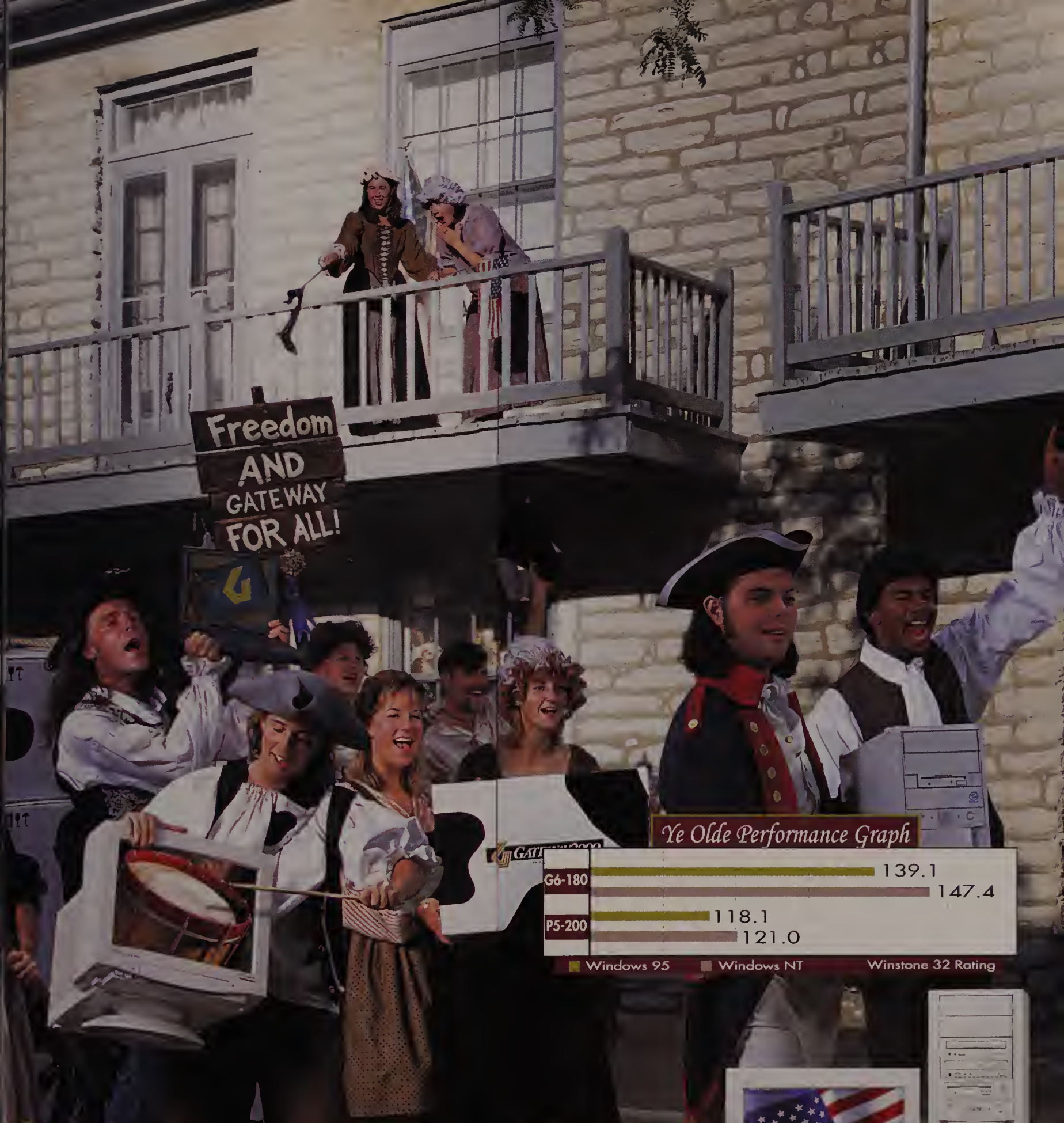

Revolutions have always been about delivering power to the people. In keeping with that tradition, we offer our Pentium® Pro processor-based G6-200XL multimedia systems and G6-180 professional systems.

Our custom configured G6 systems take advantage of the Pentium Pro processor's advanced design to squeeze every bit of breathtaking speed and performance out of the new generation of 32-bit software. The Pentium Pro also delivers high performance on today's 16-bit applications.

In fact, tests show the 180MHz Pentium Pro processor posts better overall benchmarks than a comparable 200MHz Pentium system for about the same price.** Exercise your freedom to choose, call Gateway 2000 today.

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Our custom configured G6 systems take advantage of the Pentium Pro processor's advanced design to squeeze every bit of breathtaking speed and performance out of the new generation of 32-bit software. The Pentium Pro also delivers high performance on today's 16-bit applications.

In fact, we show the 180MHz Pentium Pro processor posts better overall benchmarks than a comparable 200MHz Pentium processor about the same price.†† Exercise your freedom of choice: call Gateway 2000 today.

The GATEWAY 2000® PC revolution declares computer buyers free from the limited choices and high costs of yesterday's industry rulers. People stand at the center of our revolution, providing both the power to sustain the fight and the cause for which it is waged.

Witness our desktop systems. Our sales professionals will help you custom configure your system from available options. You can also choose from many software and operating system options, and then have the system shipped right to your door, ready to use. Such customer-centered service has captured the hearts of the people. Soon they'll expect all PC companies to follow Gateway's example, thus transforming an industry.

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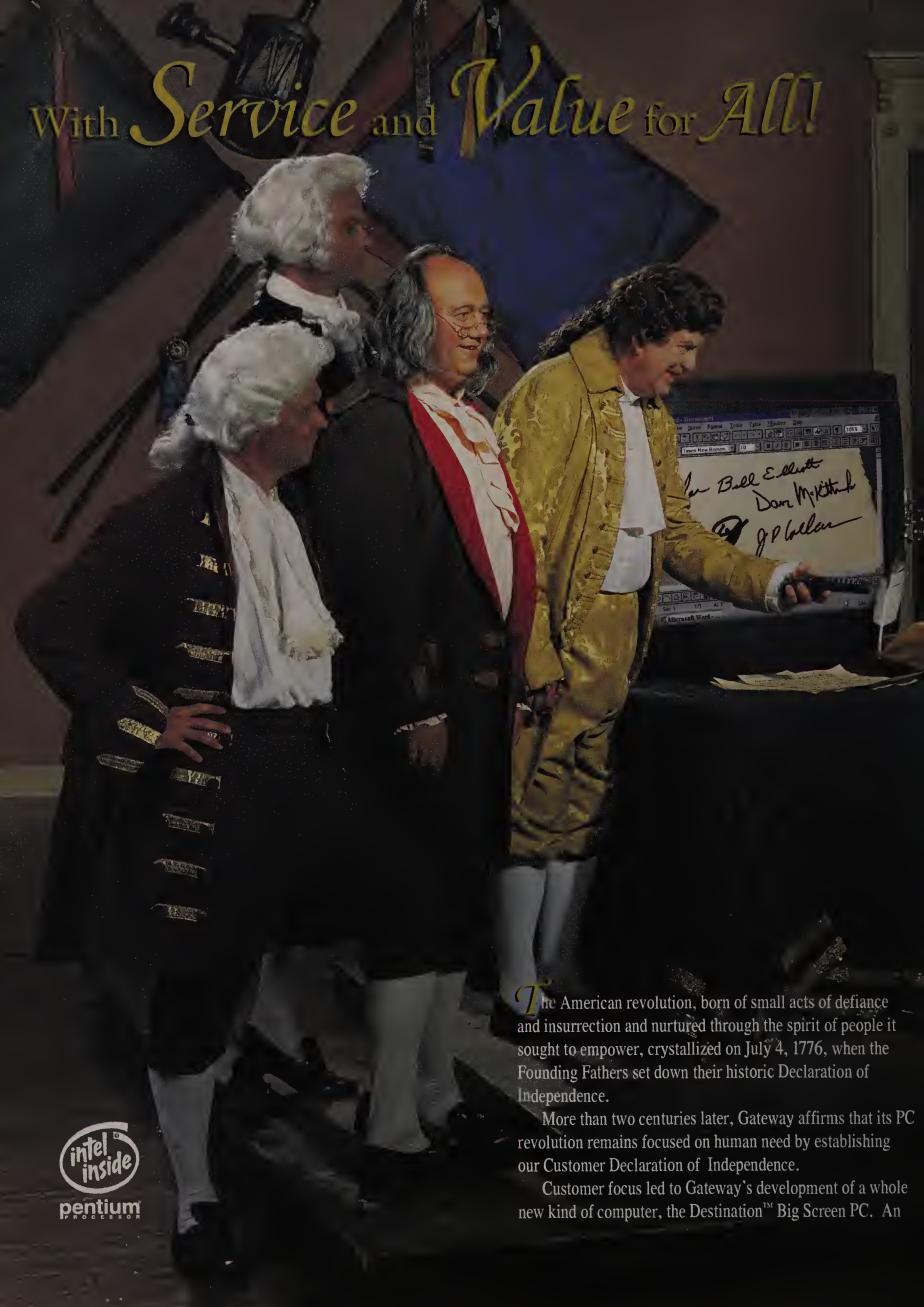

The American revolution, born of small acts of defiance and insurrection and nurtured through the spirit of people it sought to empower, crystallized on July 4, 1776, when the Founding Fathers set down their historic Declaration of Independence.

More than two centuries later, Gateway affirms that its PC revolution remains focused on human need by establishing our Customer Declaration of Independence.

Customer focus led to Gateway's development of a whole new kind of computer, the Destination™ Big Screen PC. An

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alliance between the PC and television, the Destination system is yet greater than the sum of those parts. Its powerful computer heart, huge 31-inch-diagonal screen and television capabilities make it truly a servant of the people, especially when they assemble in groups.

By declaring itself free of self-limiting thought, Gateway 2000 developed a whole new category of computer, while reaffirming its devotion to service and value. Thus the PC revolution — a revolution sustained by the people it serves — marches on.

Destination™ Big Screen PC

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- Intel® 120MHz Pentium® Processor
- 16MB EDO DRAM
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- Wireless Keyboard w/ Integrated EZ Pad™ Pointing Device
- Wireless Field Mouse® Remote
- Four-Channel RF Receiver
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- Destination Software Collection

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Business Lease† $129/mo.

D5-166

- Intel 166MHz Pentium Processor
- 16MB EDO DRAM
- 256K Pipelined Burst Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 2GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Hi-Fi Wavetable Audio Card
- TelePath 28.8 Fax/Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad Pointing Device
- Wireless Field Mouse Remote
- Four-Channel RF Receiver
- MS Windows 95
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D5-200

- Intel 200MHz Pentium Processor
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- 256K Pipelined Burst Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 3GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Hi-Fi Wavetable Audio Card
- TelePath 28.8 Fax/Modem
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computer products to enhance the lives o
the purveyors of such products to meet c

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manufacturers shall employ sales repre
freely offered information.

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technology at outstanding prices.

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shall have the right to purchase a PC
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CUSTOMERS shall have the
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THE RIGHT to knowledgeab
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We the most senior officers of Gat
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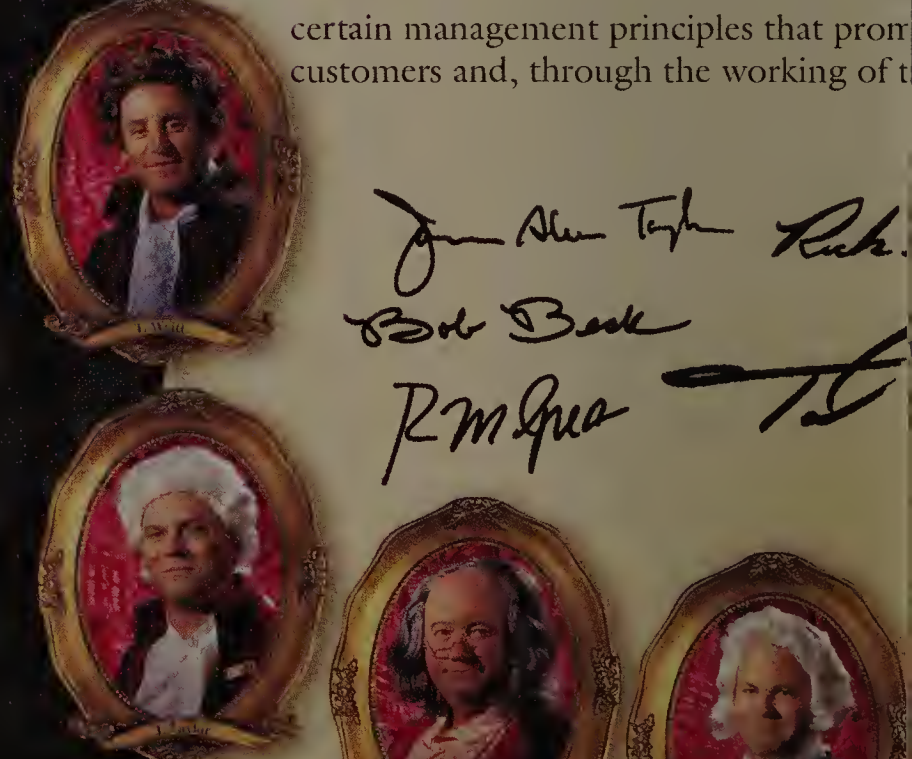

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technical support assistance, offered
smers' needs, shall be maintained.
Cs are merely tools for the benefit
h. remain the central concern
mputer.

teay 2000 do humbly commit ourselves to
e, protect and defend the interests of our
marketplace, our competitors' customers.

Bill Elliott
Dan McKitrick
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- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
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- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron17 .26dp Monitor (15.9" viewable)
- 2MB DRAM, 64-Bit PCI Graphics
- 3GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq® Wavetable Sound Card
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- Intel 133MHz Pentium Processor
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P5-166

- Intel 166MHz Pentium Processor
- 16MB Synchronous DRAM
- 256K Pipelined Burst Cache
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- 2GB 11ms EIDE Hard Drive
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- MS Office 95, Professional Edition

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P5-200

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- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- Vivitron17 .26dp Monitor (15.9" viewable)
- 2MB MDRAM, 128-Bit PCI Graphics
- 3GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition

$2649 Business Lease† $97/mo.

G6-180

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron17 .26dp Monitor (15.9" viewable)
- 2MB MDRAM, 128-Bit Graphics
- 3GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition

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Gateway Solo™ 2100 Portable PCs

S5-120

- 11.3" DSTN SVGA Color Display
- Intel 120MHz Pentium Processor
- 16MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 540MB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Works 95

$2699 Business Lease† $99/mo.

S5-133

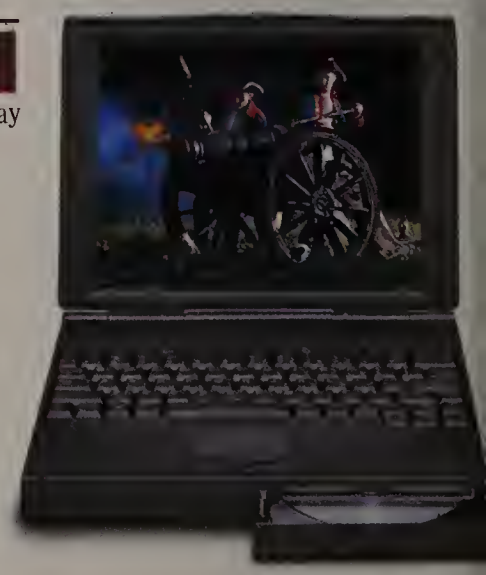
- 12.1" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 24MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 810MB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition

$3899 Business Lease† $143/mo.

S5-133 BEST BUY

- 12.1" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 40MB EDO DRAM
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 1.2GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- 28.8 PCMCIA Fax/Modem
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition

$4799 Business Lease† $176/mo.



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NEW PRODUCTS

A Tale of Two Pentium-200s: Thrifty Versus Nifty

DESKTOP

BUYING A NEW PC used to be simple: If you wanted the latest, greatest processor, you paid top dollar. But today even penny-pinchers can afford an ultrafast Windows 95 system, thanks to Dell Computer's new **Dimension P200v**, a 200-MHz Pentium PC that's priced as low as $1999.

If you want plenty of extras, however, you may prefer Compaq's $3547 **Presario 6708**, a P-200 loaded with such enhancements as a combination keyboard/scanner and a 33.6-kbps fax-modem.

The two systems nevertheless have some overlap in features: Each includes a 15-inch color monitor, 8X CD-ROM drive, and 64-bit video card with 2MB of DRAM.

CUTTING-EDGE COMPAQ: The Presario 6708 comes with a keyboard/scanner combo.

BEST BARGAIN: $1999 gets you a fast P-200 from Dell.

DIVERSIFIED DELL

WHEN WE FIRST HEARD of Dell's budget-priced P-200, we figured it was a stripped-down model with an insufficient amount of RAM and no monitor. Not so: The Dimension P200v comes with 16MB of RAM and a 1.6GB hard drive. It's speedy, too—a shipping unit we tested ran almost 5 percent faster than comparably equipped Pentium-200 systems.

How'd Dell get the price so low? The steadily declining costs of RAM and hard drives are two big factors: While 16MB of RAM cost about $400 in January, at press time it was hovering around $160.

Don't expect a bounty of extras with the Dimension P200v, however. You'll have to shell out an additional $99 for a sound card and speakers, and preinstalled software is limited to Windows 95 only.

CADILLAC COMPAQ

AT THE OPPOSITE END of the Pentium-200 spectrum is Compaq's Presario 6708, which includes 32MB of RAM and a spacious 2.5GB hard drive. But it's the Presario's eye-catching design and innovative features that make it particularly noteworthy.

For example, Compaq's unique Scanner Keyboard converts documents into electronic format. The internal fax-modem lets you transmit data at speeds of up to 33.6 kbps, and faxes at 14.4 kbps.

The Presario was about 6 percent slower than similarly configured Pentium-200s we've tested. Nevertheless, it is worth considering because of its cool extras.

PICK A PENTIUM

THE DIMENSION P200v suits small businesses that need an inexpensive yet powerful Pentium-200 for standard office tasks, while the Presario would be more appropriate for a home office.

—Jeff Bertolucci

Compaq Presario 6708

PROS: Packed with multimedia features.

CONS: Expensive.

VALUE: Good home starter system.

Compaq Computer Corp.

800/345-1518

Street price: $3547

READER SERVICE NO. 783

Dell Dimension P200v

PROS: Inexpensive Pentium-200.

CONS: No integrated audio, limited software bundle.

VALUE: You get what you pay for.

Dell Computer Corp.

800/289-3355

Street price: $1999

READER SERVICE NO. 784

KEVIN CANDLAND

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NEC, Olivetti, TI: Three Pentiums for the Road

NOTEBOOK

LIKE DESKTOP PC makers, notebook manufacturers keep developing new "standard" systems that incorporate the latest technologies to add more bang for the buck. The current trend is Pentium-based notebooks that hit the middle ground between economy-priced entry-level systems and loaded luxury portables. No surprise, then, that three new portable lines—the NEC **Versa 4200**, the Texas Instruments **TravelMate 6000**, and the Olivetti **Echos**—have plenty of features

NEC'S VERSA 4200 series benefits from a fast 128-bit video system.

in common including jumbo hard disks, built-in sound cards and speakers, and a modular expansion path.

NEC'S GRAPHIC POWER

NEC'S VERSA 4200 series is available in a 100-MHz version with an 810MB hard disk ($2999) and a 133-MHz version with a 1.08GB hard disk and a 6X CD-ROM drive ($3899). Weighing about 6.5 pounds each, both have 8MB of RAM, long-life lithium ion batteries, and 10.4-inch TFT screens that deliver 256 colors at 800 by 600 resolution. Driving the screen is a new 128-bit single-chip NeoMagic video system that NEC says provides speedy graphics for minimal power. But there's no modem and no communications software.

TI'S TOP SHELF

TI'S TRAVELMATE 6000 series consists of a pair of 6-pound systems with hefty price tags. The 6020 ($4199) has a P-120 processor, 8MB of RAM, a 1.08GB hard disk, and an 11.3-inch TFT display. The 6030 ($4999) has a P-133 processor, 16MB of RAM, a 1.35GB hard drive, and a big 12.1-inch SVGA TFT display. (The 6050 at $5499 is configured similarly but has a P-150 processor.) Rounding out the standard features are lithium ion batteries and a 28.8-kbps modem with a complete suite of Internet and telephony applications. But what really sets the TI apart is a Zoomed Video port for use with new PC Cards that support full-screen, full-motion video for entertainment and business applications.

OLIVETTI APPLIED European style sense to its sleek Echos notebook line.

ENTER OLIVETTI

OLIVETTI—a company better known in Europe than in the United States—enters the U.S. market with its Echos line of notebooks. The company offers four models, ranging from the entry-level $2299 100-MHz P100C to the top-of-the-line $4599 133-MHz P133S. Each weighs in at about 6.5 pounds and includes a 1.3GB hard drive and a 6X CD-ROM drive. Screens range from an 11.3-inch dual-scan on the low end to a big, bright 11.8-inch TFT display.

All these notebooks have optional docking stations to extend functionality. Though you still pay a premium for portability, prices continue to fall. On the downside, all three companies provide a miserly 8MB of RAM with their basic systems yet charge a premium for RAM upgrades. Outfitting a Pentium with less than 16MB of RAM is like equipping a sleek sports car with a 4-cylinder engine.

—Stan Miastkowski ▶

NEC Versa 4200 Series

PROS: High-quality NEC reputation.
CONS: Modem not included.
VALUE: Performer worth its cost.
NEC Technologies
800/338-8888
http://www.nec.com
Street prices: $2999 to $3899
READER SERVICE NO. 785

Olivetti Echos

PROS: Models for all budgets.
CONS: Modem not included.
VALUE: Options and price look good.
Olivetti Personal Computers USA
888/465-4838
http://www.olivettipc.com
Street prices: $2299 to $4599
READER SERVICE NO. 786

TI TravelMate 6000 Series

PROS: Loaded with extras.
CONS: No entry-level system.
VALUE: Not for the casual user.
Texas Instruments
800/848-3927
http://www.ti.com
Street prices: $4199 to $4999
READER SERVICE NO. 787

INTERNET

FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at **http://www.pcworld.com/news.html.**

EDITED BY
Laurianne McLaughlin and Gabrielle Mitchell

Computing a-Go-Go

NOTEBOOK

AS THE WORLD GOES mobile, Fujitsu follows the trend with the **Montego**, a new lightweight portable. We were pleasantly surprised by our review unit's performance.

Even at just 4.9 pounds, the Montego packs substantial features. Inside you'll find a P-100 processor, a 1GB hard drive, and a removable 3.5-inch floppy drive that can be swapped with an extra lithium ion battery that allows up to 6 hours of power, according to the vendor. It has two Type II PC Card slots and a 10.4-inch SVGA active-matrix color screen. However, the system's 8MB of RAM is skimpy for today's demanding applications.

AT 4.9 POUNDS, Fujitsu's new Montego is easy to carry, yet packs power.

We found the keyboard and pointing stick comfortable even for someone with relatively large hands. Windows 95 and Lotus's SmartSuite 96 are preinstalled.

For those who rely on high-end audio capabilities, there's a built-in wavetable sound card; our unit, though, wasn't configured to load the card's drivers in DOS sessions. To conserve space, the Montego has no internal CD-ROM drive, but an external unit is easily connected. Overall, the Montego is a good choice for a user on the road.

—Shane Mooney

Montego

PROS: Light, compact, nice extras.

CONS: Size means sacrificing internal CD-ROM drive.

VALUE: Easy to tote for mobile user.

Fujitsu PC Corp.

888/466-8434

Street price: $2999

READER SERVICE NO. 788

QUICK TAKES

Nuovo: Energizer Bunny Notebook

We haven't been able to test it yet, but Acer's **Nuovo** multimedia notebook promises battery life of up to 10 hours. Although this P-133 machine boasts an 11.8-inch active-matrix or 11.3-inch dual-scan display, 28.8-kbps DSVD modem, and 128-bit graphics, Acer says that a combination of low-power components, a lithium ion battery, and power management software allows the Nuovo to adapt to your work habits and maximize battery life. The 7-pound Nuovo also packs a tilting keyboard, speakers, and a floppy drive that can be swapped out for a 6X CD-ROM drive. Pricing starts at $3499. Acer America Corp., 800/733-2237.

READER SERVICE NO. 790

Sharp PC-9080: The Traveler's Best Friend

NOTEBOOK

SHARP'S LATEST notebook, the **PC-9080**, directly addresses the common problems of screen quality and data transfer without compromising the unit's power. This new portable is equipped with a 4-megabits-per-second infrared port for high-speed wireless data transfer and LAN access, as well as a bright, 12.1-inch LCD screen that uses new technology to improve on its resource requirements.

The slow transfer rate of the prevailing IrDA standard has hindered the widespread adoption of infrared technology. Maxing out at 115 kilobits per second, IrDA ports are adequate for transmitting data between a notebook PC and a handheld device, but they fail miserably when it comes to connecting to corporate LANs. According to Sharp, the PC-9080's infrared port works with any IrDA-standard port but transfers data at least 35 percent faster.

And the PC-9080 is the first notebook equipped with Sharp's Advanced Super High Aperture LCD technology. This means there are smaller transistors in the backlight, so overall power consumption is lower than a standard screen's, according to Sharp. More important, not only does the 12.1-inch LCD show crisp graphics in up to 1024 by 768 resolution, but it's one of the clearest, brightest screens we've seen—just right for impressing a small group with a presentation.

The unit includes a Pentium-133 processor with 16MB of EDO RAM, a 1.3GB hard drive, a 6X CD-ROM drive, a 3.5-inch floppy drive, 16-bit Sound Blaster Pro–compatible sound card, and a built-in 28.8-kbps fax-modem. The model also sports a GlidePoint that is located awkwardly in the middle of the wrist rest; we found our wrists rubbing the rest while typing and spent a good deal of time chasing the wayward cursor.

We looked at a preproduction model of the PC-9080 and so couldn't test the notebook's performance or the life of its lithium ion batteries.

—Catherine Kenny ▶

Sharp PC-9080

PROS: Impressive screen, superfast infrared port.

CONS: GlidePoint placed awkwardly in wrist rest.

VALUE: Best for presentations.

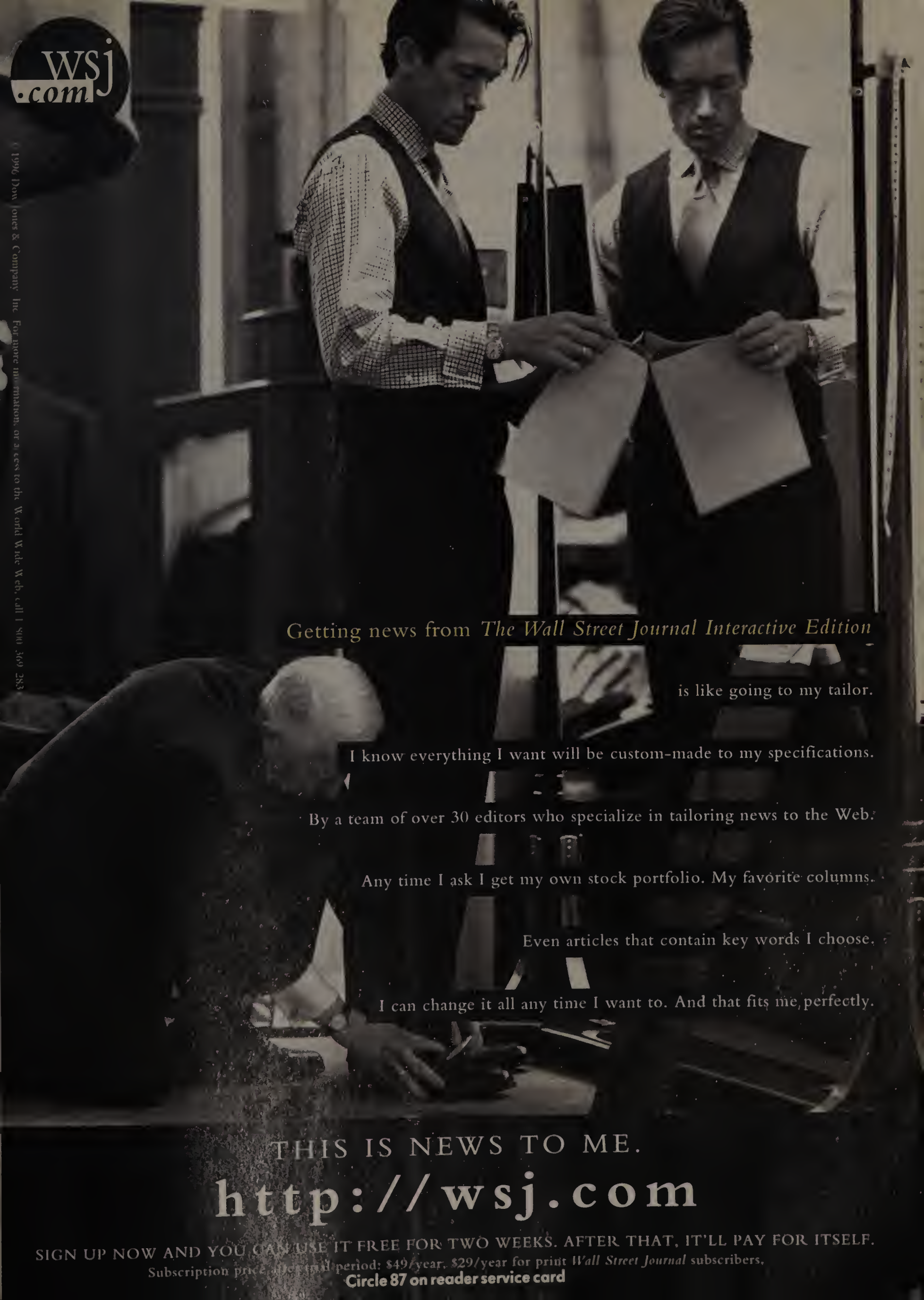
Sharp Electronics Corp.

800/237-4277

Street price: Just under $6000

READER SERVICE NO. 789

SUNGLASSES RECOMMENDED: The Sharp PC-9080 offers a clear, bright screen.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IBM Lasers: Close Cousins to the Competition

PRINTER

IBM HAS ENTERED the printer market for the first time in years with "me too" printers that resemble competing products. Big Blue's Printing Systems line includes 12-, 17- and 24-pages-per-minute network lasers but no new technology. The units should have street prices in the range of Hewlett-Packard's affordable LaserJets. The new printers are respectable, but not innovative. The one model that stands out is the color laser.

The IBM **Network Color Printer**, expected to sell for about $7500 street, is similar to products in the $10,000 range from Canon and Digital.

The 600-dots-per-inch resolution Network Color Printer ships with 16MB of RAM and memory compression technology, compared to the Digital Colorwriter LSR 2000's 32MB of RAM. It is rated at 12 ppm for monochrome and 3 ppm for color—as fast as any color printer in its price range. IBM built in an EFI Fiery controller with a fast 100-MHz RISC processor, so this printer provides more sophisticated color and better speed than two popular $6000 units, the HP Color LaserJet and Lexmark Optra C.

IBM's new line of monochrome lasers starts with the IBM **Network Printer 12**, expected to sell for $1279. It comes with 4MB of RAM, a rated print speed of 12 ppm, one 250-sheet paper tray, and a second tray that holds 80 sheets and 10 envelopes. It offers 600-dpi resolution and PCL 5e emulation. Adobe PostScript Level II support costs an extra $299.

HP's Laser Jet 5, street-priced at $1299, is nearly identical, but it includes HP's newest printing language, PCL 6, which manages memory better, prints complex graphics faster, and returns you to your application faster than does PCL 5e. Lexmark's $1300, 16-ppm Optra R+, which comes with PostScript Level II, has more speed for about the same price.

IBM's **Network Printer 17**, expected to cost from $1650 to $1700, comes with 4MB of RAM and a 250-sheet paper capacity. This 17-ppm laser also lets you add a $1249 secure "mailbox" that sorts print jobs into locked bins, which you open by using an ID number. Xerox's recently introduced 4517 ($1850) is almost identical, right down to the print engine and the mailbox option.

Expected to sell for $2700 to $2800, IBM's **Network Printer 24** has 4MB of RAM and an 1100-sheet capacity. HP's LaserJet 5Si, a 24-ppm, 600-dpi unit with 4MB of RAM, costs $2779. Lexmark's similar Optra N 240 costs about $2850 and offers PostScript Level II support.

—Laurianne McLaughlin

IBM'S NETWORK COLOR PRINTER handles long documents easily.

IBM network printers

PROS: Color printer is best of this bunch.

CONS: Product line offers little over leading competitors.

VALUE: No real standout here, but you won't get burned if you buy IBM.

IBM Printing Systems Company
800/426-3333
http://www.ibm.com
Street prices: $1279 to $3400, color laser $7500

NetMailer: New Trick for Mass E-Mailing

UTILITY

ANY E-MAIL PRODUCT lets you send a message to multiple recipients. But things start getting complicated when you need to send hundreds or thousands of messages, or you don't want the recipients viewing your mail list. Off-the-shelf e-mail software just isn't up to the task. Alpha Software says it has solved the problem with **NetMailer**, a stand-alone Internet e-mail package with full mail merge capabilities.

NetMailer is easy to use and lets you customize and automate the process of sending mass e-mail—with or without attachments. Although junk mail comes immediately to mind, there are a raft of other potential uses for NetMailer, from sending periodic reports to e-mailing newsletters, reminders, and notices.

When using NetMailer, you must send messages through Internet mail. To construct your mailing list, NetMailer reads any standard .dbf database file. Or you can import an ASCII list of names. However, you can't import addresses right from LAN e-mail packages like cc:Mail. NetMailer works with both Windows 95 and 3.1; a more sophisticated product, NetMail Server for Windows NT, is designed for really large mass e-mailings, but its price was not available at press time.

—Stan Miastkowski ▶

NetMailer

PROS: Inexpensive and easy to use.

CONS: Can generate junk e-mail.

VALUE: Eases bulk e-mail hassles.

Alpha Software
617/229-2924
http://www.alphasoftware.com
Street price: $99

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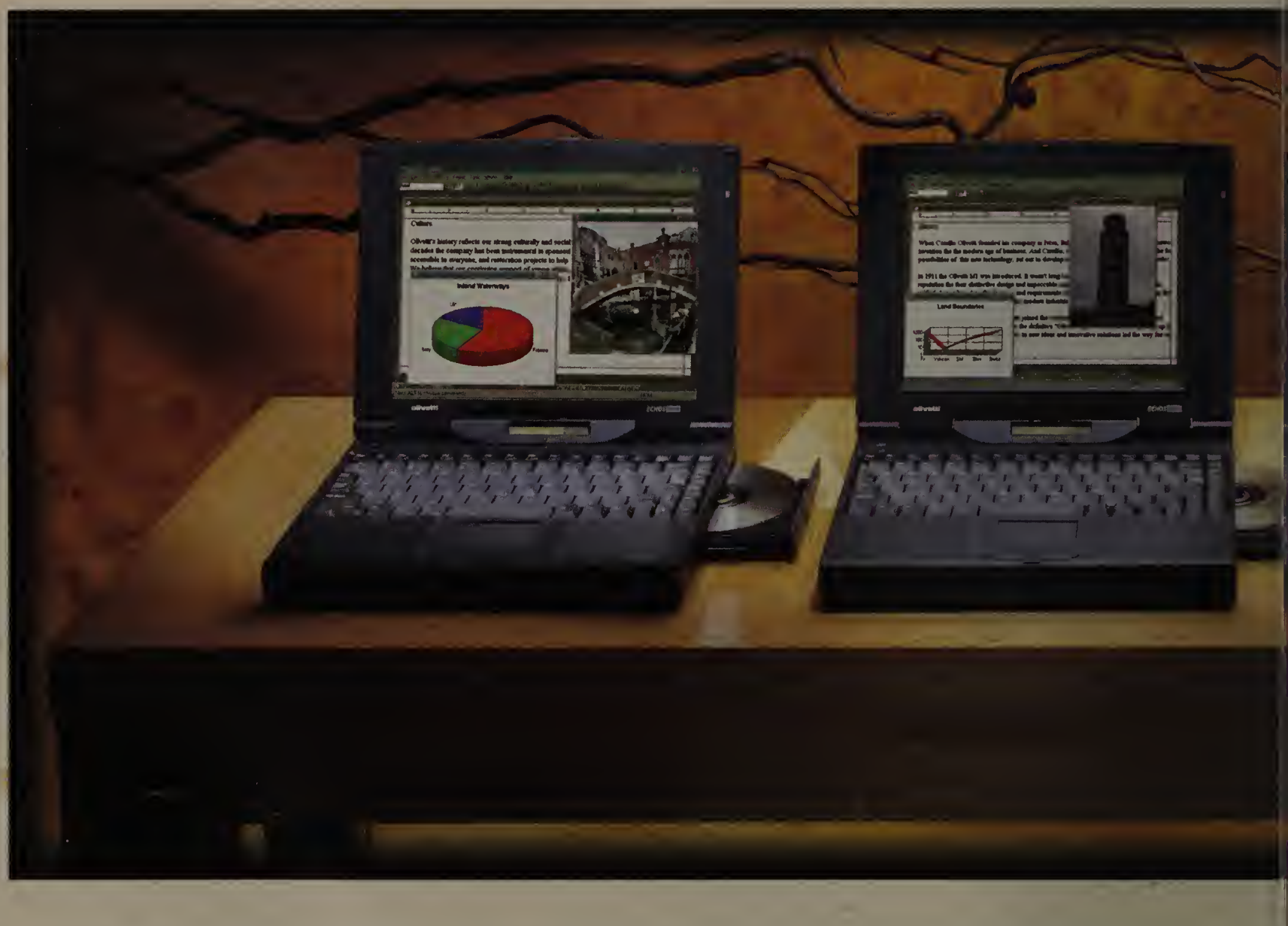

Echos P100C

100MHz Pentium processor
PCI Bus, 256K L2 cache
8MB std./40MB max. RAM; 1.3GB removable HDD
11.3" DSTN display; 800x600 SVGA resolution
Multi-function bay: 6X CD-ROM (std.),
modular FDD (std.), second battery (opt.)
Est. Street Price:

$2,299*

Echos P100E

100MHz Pentium processor
PCI Bus, 256K L2 cache
8MB std./40MB max. RAM; 1.3GB removable HDD
10.4" TFT display; 800x600 SVGA resolution
Multi-function bay: 6X CD-ROM (std.),
modular FDD (std.), second battery (opt.)
Est. Street Price:

$2,799*

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Echos P120E

120MHz Pentium processor
PCI Bus, 256K L2 cache
8MB std./40MB max. RAM; 1.3GB removable HDD
11.3" TFT display; 800x600 SVGA resolution
Multi-function bay: 6X CD-ROM (std.),
modular FDD (std.), second battery (opt.)
Est. Street Price:

$3,599*

Echos P133S

133MHz Pentium processor
PCI Bus, 256K L2 cache
16MB std./40MB max. RAM; 1.3GB removable HDD
11.8" TFT display; 800x600 SVGA resolution
Multi-function bay: 6X CD-ROM (std.),
modular FDD (std.), second battery (opt.)
Est. Street Price:

$4,599*

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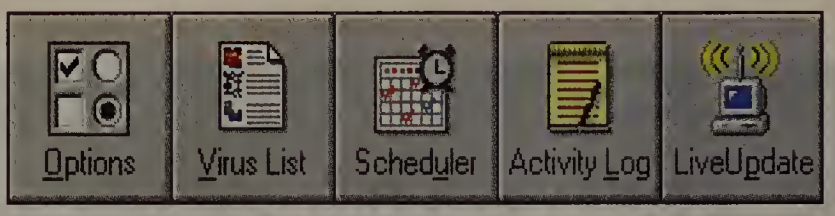
Norton AntiVirus 2.0 Stamps Out PC Infections

UTILITY

FOR YEARS, Symantec's Norton AntiVirus has been doing an excellent job of detecting and eradicating viruses. The latest version for Windows 95 adds new features that make it easier to use, better and faster at combating the nasty bugs, and a breeze to keep up to date.



FREE UPDATE: Click on the LiveUpdate icon (at right) in Norton AntiVirus 2.0 to download the latest virus definitions.

Norton AntiVirus 2.0 for Windows 95 requires about 12MB of hard drive space for the recommended full installation, which provides continuous protection from startup. In the beta version we examined, we found that the utility works unobtrusively in the background until a virus is detected. If NAV 2.0 finds a virus, it pops directly into a Repair Wizard that takes you step-by-step through the repair process. This is a big step forward from other packages, where eradicating viruses can be a complex process that requires you to pull out the manual and follow multiple steps in exact order.

One particularly useful feature: if Norton AntiVirus 2.0 detects Netscape Navigator on your PC, it gives you the option of installing a Navigator helper application that checks all downloaded files for viruses before they're saved to disk. If you're a serious Web surfer, this feature alone can help NAV 2.0 pay for itself in short order.

To fight viruses, NAV 2.0 uses the latest tricks, including the new Striker technology. Striker has the ability to detect complex viruses, which are particularly difficult to track down because they continually change themselves. Norton AntiVirus 2.0 runs suspect files in a protected "Virtual PC" area in memory until it's sure they're safe.

One of the biggest pains with many antivirus packages is keeping virus definitions up to date. Symantec has neatly solved that problem. Not only are monthly updates available for free, but all you need to do is click the LiveUpdate icon in NAV 2.0, and the program automatically connects to Symantec (via its BBS or Internet FTP site), downloads the update, and installs it.

At about $70, NAV 2.0 is essential for any Windows 95 PC. Like an insurance policy, you hope you'll never need it; but it's invaluable if you do.

—Stan Miastkowski

Norton AntiVirus 2.0 for Windows 95

PROS: Painless virus protection with free updates.

CONS: Requires copious disk space.

VALUE: Extra online protection and Striker technology are invaluable.

Symantec

800/441-7234

http://www.symantec.com

Street price: $70, upgrade $30

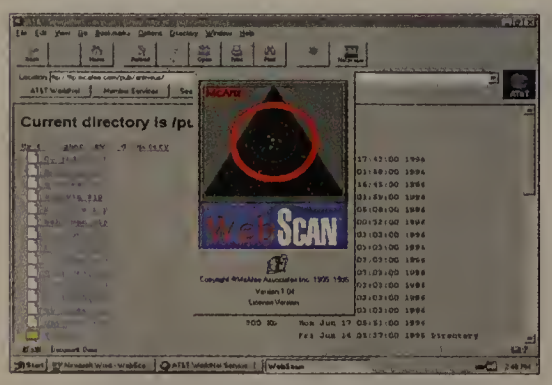
READER SERVICE NO. 791

WebScan Screens for E-Mail, Web Viruses

UTILITY

IF YOU'RE A longtime Net surfer, chances are you've inadvertently downloaded a software virus at least once or twice. McAfee's **WebScan 1.04** is designed to protect your PC from these invaders. This handy Windows utility, street-priced at $45, automatically detects and destroys viruses attached to downloaded files and e-mail messages.

During installation, WebScan configures itself to work with your existing e-mail and Web browsing software, including Lotus cc:Mail, Netscape Navigator's 16-bit (Windows 3.1) and 32-bit (Windows 95) versions, Microsoft Internet Explorer, and America Online's browser. If you're not already wired to the Net, WebScan comes with Pegasus E-mail and the Spry Mosaic browser. (Finding an Internet service provider is up to you.)



ANTIVIRUS GUARDIAN FOR NET SURFERS: WebScan checks e-mail and data for viruses.

When you retrieve a file or an e-mail message, WebScan checks the data for potential viruses as it downloads. If the file is clean, WebScan saves it to a user-specified folder or directory. Testing a prerelease copy of version 1.04, I found that WebScan worked seamlessly with my copy of Navigator 2.0, but failed to scan files downloaded with AOL 3.0's Web browser—perhaps due to a glitch in the prerelease copy of WebScan that we used.

WebScan 1.04 detects more than 5800 viruses and also scans compressed file formats such as .zip, .arc, .arj, and self-extracting .exe files, according to McAfee. If its shipping version works as advertised, WebScan could be a helpful tool for Web surfers everywhere.

—Jeff Bertolucci ▶

WebScan 1.04

PROS: Scans Internet downloads for viruses.

CONS: Some glitches in prerelease version.

VALUE: Cheaper and lesser known than NAV 2.0, but good alternative.

McAfee Associates

408/988-3832

Street price: $45

READER SERVICE NO. 792

Make the Perfect Getaway!

***"The new AAA Map'n'Go is by far the most complete travel planning program available. It is unbelievable how many features are packed into one CD, and yet it is fun and easy to run."* W. Bowers, Chandler, OK.**

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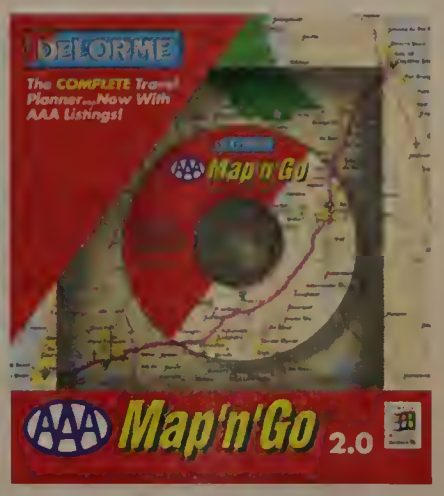
Available from your local software store or software catalogs.
Or order direct from DeLorme at 1-800-452-5931, ext. 016
or preview at www.mapngo.com.

**GPS receiver required*



DELORME

Circle 37 on reader service card

Reduce Tedium With Tempo Shortcutter

UTILITY

UPGRADING TO Windows 95 may have brought some great conveniences to the desktop—Shortcuts, better visual folders, a more customizable work space. But Windows 95 left some things out, such as the Recorder utility for macros in Windows 3.1.

Tempo Shortcutter

PROS: Creates conditional macros.

CONS: Not necessary with legacy Windows 3.1 Recorder.

VALUE: Necessary with Win 95.

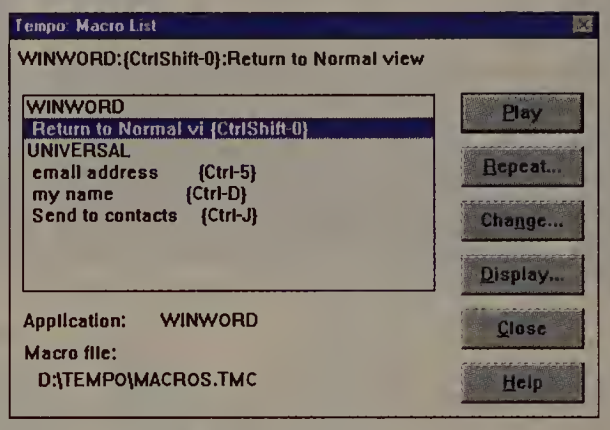
Affinity Microsystems Ltd.

800/367-6771

List price: $79.95

READER SERVICE NO. 793

If you have upgraded from Win 3.1, then Recorder most likely is still on your PC, but if your system came with Windows 95 preloaded, you'll need a third-party utility to take its place. Like Recorder, **Tempo Shortcutter** can create universal macros, but Tempo can create conditional macros as well.



MACROS CREATED BY TEMPO SHORTCUTTER can run in your applications universally.

Tempo enables you to record and save keystrokes and mouse movements for instant playback. To create a macro, you simply start recording, perform the actions in sequential order, and then stop recording. Your macros can thereafter be run via an assigned shortcut key, from an icon on the desktop, or from the Shortcutter window.

Although Shortcutter and Windows 3.1's Recorder are similar, Shortcutter goes one step further by allowing you to create conditional macros. For instance, you could create a macro that launches a contact manager whenever a message from a particular individual is received in your e-mail inbox. The macros you create in Shortcutter also have an advantage over the tools you'd find in Excel or Word: You can create a macro that will run across applications. If your day is filled with repetitive tasks and you don't want to learn a programming language just to create macros, Shortcutter is worth its $79.95 price tag.

—Catherine Kenny

Automate Server Administration

NETWORKING

AUTOMATING the administration of NetWare servers generally involves learning a new scripting language. But **Snap-In AutoAttendant** from Snap-In Softools takes on some of the simpler tasks without requiring you to learn a new language. AutoAttendant allows you to schedule such tasks as loading and unloading NetWare Loading Modules, running a tape backup of your server, or other jobs you would normally perform from the console. And because AutoAttendant's client component uses the snap-in interface of NetWare's Windows-based NWAdmin program, NetWare administrators who are already familiar with the interface can start using AutoAttendant immediately.

Installation is easy. When you set up AutoAttendant, the client program automatically finds your NWAdmin initialization file and inserts itself. You'll then be prompted to install the server-based AutoAttendant NLM. You can choose to have AutoAttendant NLM run automatically when the server is started up.

The AutoAttendant client generates a file of scheduling information, which the AutoAttendant server component executes. You can view Today's Schedule from the AutoAttendant Client's main screen and modify the schedules for a specific day of the week, as well as general daily, weekday, and weekend schedules. Once you've selected the schedule you want to modify, you use the point-and-click interface to enter commands. You can use console commands and keystroke combinations, or restart the server at a specified time. After entering your schedule changes, you click the Rebuild button to send the information to the server, where it is processed and updated.

While scheduling administrative tasks is the program's forte, you can use AutoAttendant to manage the server in real time. You can disable and enable logins, and reboot the server from AutoAttendant's screen. Moreover, you can hold or cancel tasks from AutoAttendant. And schedules can be exported, imported, and printed.

The NetWare snap-in interface makes it easy to work with AutoAttendant, but the lack of a programming interface means that there's no way to troubleshoot errors. AutoAttendant assumes that whatever commands you enter work right with no problems. This weakness is overcome by the simplicity of the program and its low cost: $99 for a single server license, $2499 for 100 servers. For automating simple tasks, AutoAttendant is a great option.

—Bill Rinko-Gay ▶

Snap-In AutoAttendant

PROS: East to master, snaps into NWAdmin.

CONS: Lacks error handling.

VALUE: Cost, interface are winning combination for NetWare users.

Snap-in Softools

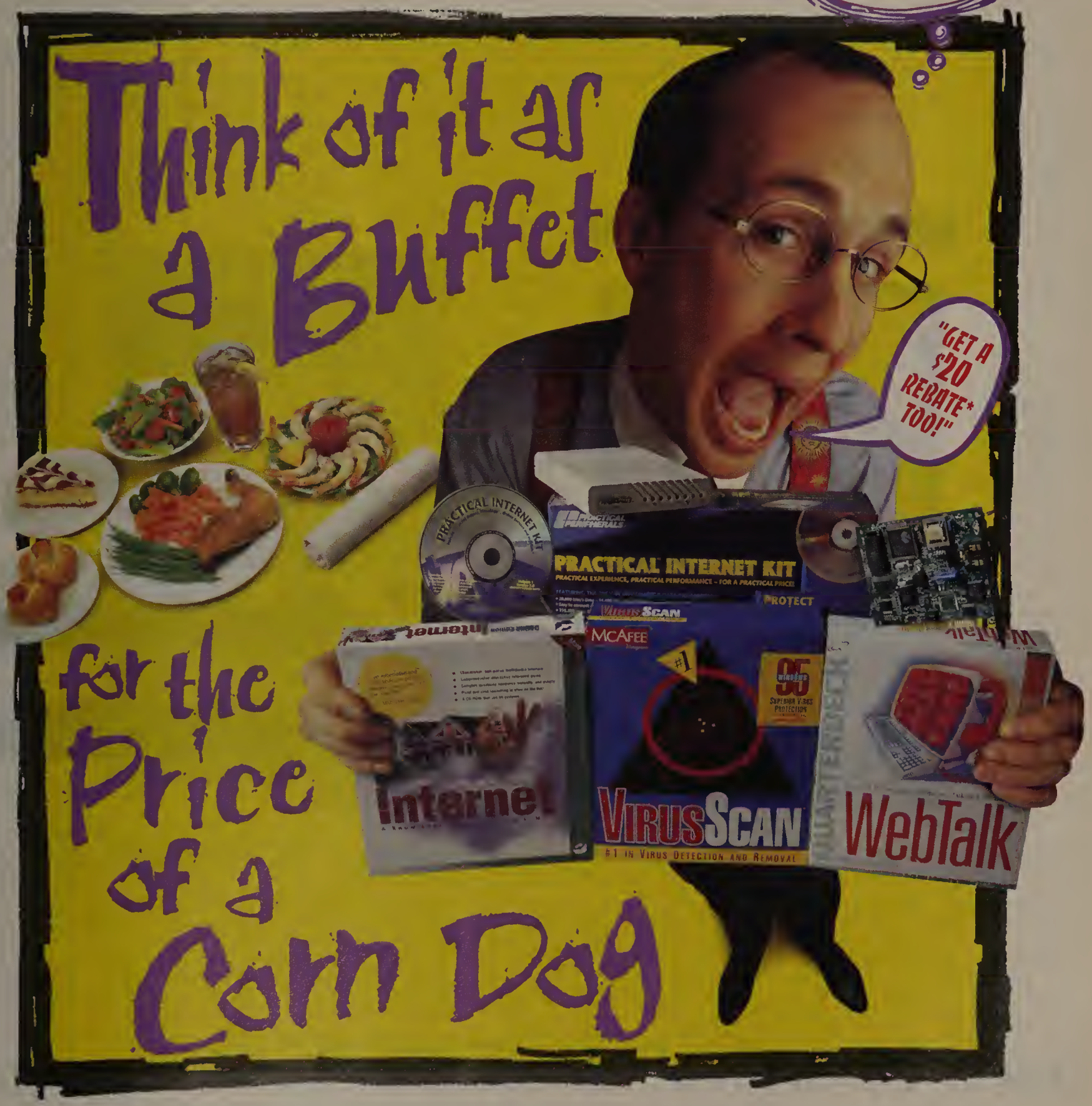
800/476-2746

List price: $99 for single server, $2499 for 100 servers

READER SERVICE NO. 794

Introducing The Practical Internet Kit.

AT $129 INTERNAL AND $149 EXTERNAL
WHAT A VALUE!



The Practical Internet Kit is the first *complete* Internet Kit to provide you with the necessary tools to fully experience, work, and enjoy the Internet. The Kit features the Practical Class 288 V.34 Data/Fax modem (upgradeable to 33.6) and an outstanding array of CD-ROM-based software. **LEARN** about the Internet off-line with MindQ's tutorial. **ACCESS** the Internet through a variety of leading service providers and web browsers including Netcom Access Kit containing Netscape Navigator™ Internet client. **TALK** on the Internet via Quarterdeck WebTalk.™** **PROTECT** data integrity from viruses on the Internet with McAfee's VirusScan.™ The Practical Internet Kit ships with Quicklink™ II Data/Fax software, and is backed by 7 day technical support and a lifetime limited warranty. It's even Windows NT compatible. What a value! For more info, call 800-964-2937, ext. 290 or use PRACTIFAX at 800-225-4774 and select document 4005.

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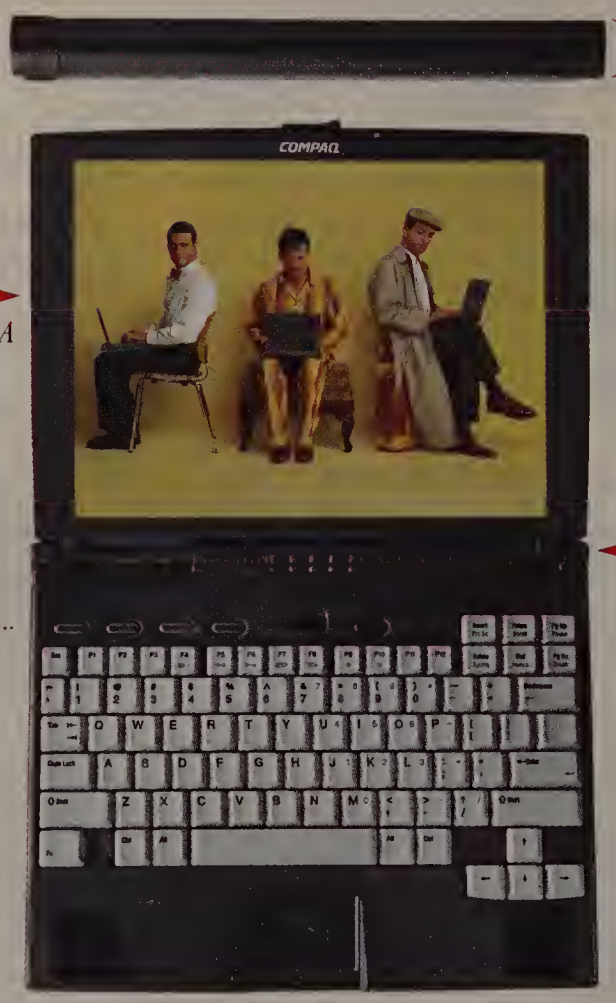
*See rebate coupons in store or visit our website. © 1996 Practical Peripherals. Phone 770-840-9966 Fax 770-734-4601 BBS 770-734-4600. E-mail support@practinet.com. Web Site: http://www.practinet.com. Practical and the Practical Peripherals logo are trademarks of Practical Peripherals. **Sound Card, speakers, and PC microphone required

configure 1

- Full-Function Notebook
- Lithium Ion Battery
- Internal Diskette Drive



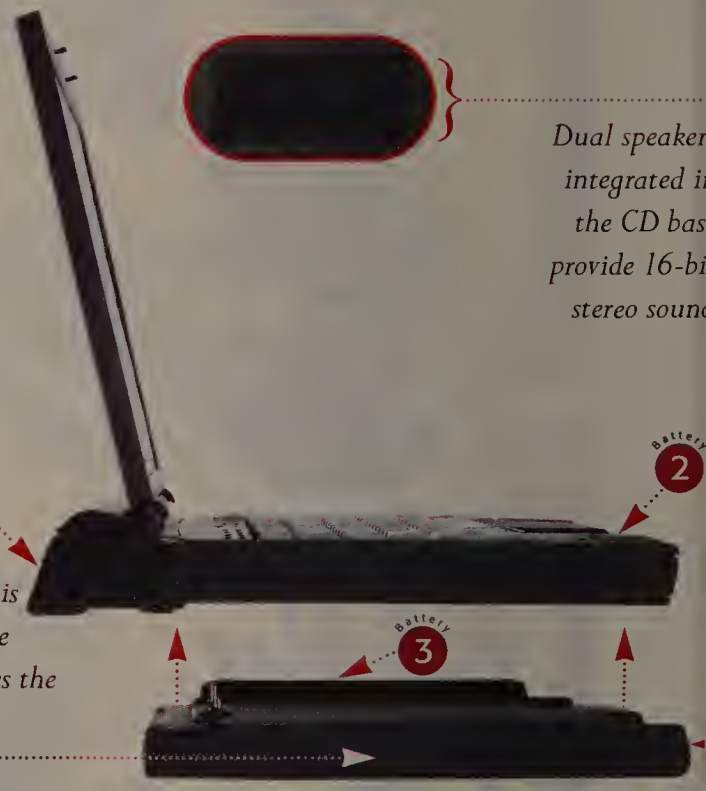
Detachable lithium ion battery also functions as a handle and a keyboard tilt.

Choice of SVGA displays from 11.3" CSTN to 11.8" CTFT.

Up to 133 MHz Pentium® processor, hard drives up to 1 GB.

configure 2

- Multimedia
- CD-ROM
- 3 Lithium Ion Batteries
- 16-Bit Stereo Sound
- Dual Speakers
- NTSC/PAL TV Output



Dual speaker integrated i the CD bas provide 16-bi stereo soun

This base is detachable and houses the CD-ROM.

THE COMPAQ ARMADA 4100. IF IT'S

It's your call. On one hand, it's a full-function notebook. Or in a snap it's multimedia with CD-ROM. Or it's lean and mean. It a fax machines* and dual speakers for incredible 16-bit stereo sound. And it's Internet-ready. The new Compaq Armada 4100. It's how

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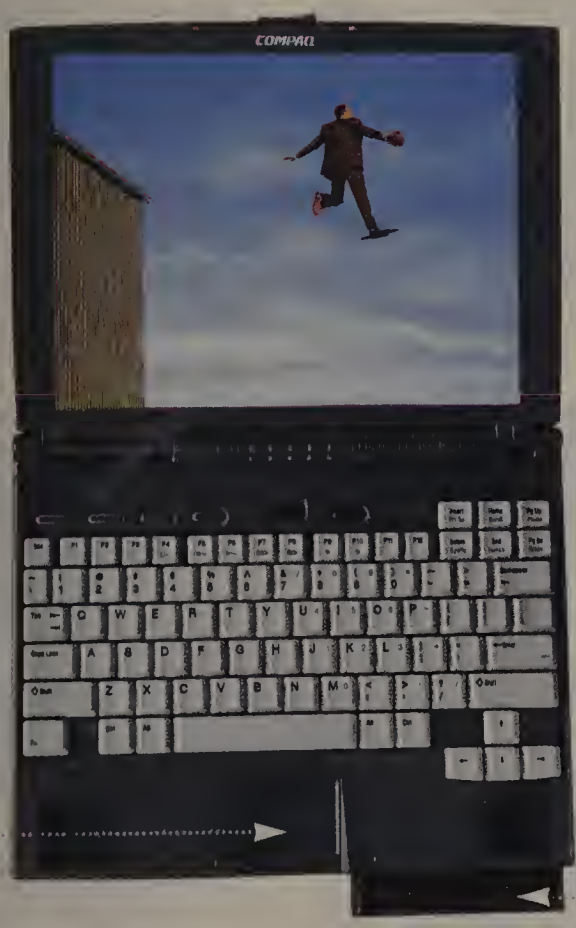
configure 3

- Slimline
- 5.1 Lbs.
- 1.5" Thick

configure 4

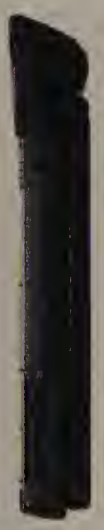
- Rest
- Relaxation
- Peace of Mind



Memory expandable up to 48 MB.

Touchpad can be replaced by an optional trackball.

Internal diskette drive is replaced by a battery.



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Has It Changed Your Life Yet?

Circle 61 on reader service card

Mitsubishi Unveils Innovative 21-Inch Monitor

MONITOR

MITSUBISHI'S NEW 21-inch monitor, the **DiamondPro 91TXM**, yielded less distortion and better color in our informal tests than did 21-inch monitors based on Sony's Trinitron tube, today's most popular monitor technology. The Mitsubishi Diamondtron tube uses a new electron gun that precisely shoots electron beams onto the screen surface, making pictures and type on the 91TXM look sharper and brighter.

Using *PC World*'s Top 10 Monitors test suite, I compared a preproduction 91TXM unit with a 21-inch ArtMedia monitor that uses a Sony Trinitron tube. The 91TXM produced superior quality text and graphics—particularly in the corners of the screen—as well as less misconvergence (color bleeding between screen phosphors) and a more evenly lit screen. I also spotted small details in graphics I hadn't noticed before, such as knots on tree trunks.

Aside from the electron gun, how does the DiamondPro differ from a Sony Trinitron–based monitor? For starters, the 91TXM has a larger viewable screen size—19.8 inches diagonally, compared to 19.2 inches on Trinitron units. The Diamondtron also has a tighter .28mm stripe pitch (the gap between like-colored phosphor stripes) compared to the .30mm stripe pitch on a Trinitron monitor. This makes colors richer.

The 91TXM meets Sweden's TCO92 emissions standard, the toughest. Overall, this is a high-caliber monitor with a giant screen, ample controls, and a three-year warranty, for an acceptable $1899 price.

—John Goddard

Mitsubishi DiamondPro 91TXM

PROS: Sharp, bright graphics.

CONS: Price is high for casual users.

VALUE: Excellent high-end choice.

Mitsubishi Electronics America

800/843-2515

http://www.mitsubishi-display.com

Street price: $1899

READER SERVICE NO. 796

QUICK TAKES

Bargain-Basement Graphics

Few entry-level drawing packages cost less than **Micrografx Windows Draw 5**, a $49, scaled-down version of ABC Graphics Suite. While the prerelease version we examined wasn't complete, it looked promising. Pick from a slew of predesigned projects—ranging from brochures and business cards to forms and flyers—and a project wizard guides you to a finished drawing, complete with clip art and your text. Or use the arsenal of drawing tools and special effects to make your own graphics. Micrografx also includes Photo Magic 4, ABC Media Manager 7, and a collection of 20,000 clip-art and photo images. Micrografx, Inc., 800/676-3110.

READER SERVICE NO. 798

Corel's Best Multimedia Authoring Program

MULTIMEDIA

IF YOU'VE BEEN yearning to put together multimedia presentations, training materials, or other interactive productions, check out **Corel Click & Create**. This new $695 multimedia authoring package has many of the same capabilities as Aimtech IconAuthor, Innovus Multimedia, and other products in the $1000 price range. Best of all, it reduces much of the work to simple dragging and dropping.

Like its competitors, Click & Create lets you use different editor views—storyboard, frame, event, time line—to assemble and manage a multimedia production. It comes with excellent tutorials, examples, and a truckload of clip media, including images, video, animation, and sound. But the software doesn't make you learn a complicated scripting language to build productions. Instead, you quickly drag and drop objects on a frame and use right-mouse clicks for detail work.

Though Click & Create has built-in editors for animation, images, and morphing, it lacks editing tools for sound and video. I'd also like to see integrated Internet features—for example, one that helps distribute a production through a Web server.

Click & Create is compatible with Windows 3.*x*, 95, and NT. Although the shipping version I reviewed lacked cross-platform compatibility, Corel says a Macintosh version will be out by the time you read this.

—Richard Jantz ▶

EASY MULTIMEDIA: Corel's affordable Click & Create is simple to use, compared to existing products. Work is a matter of drag and drop.

Corel Click & Create

PROS: Easy drag-and-drop features, inexpensive.

CONS: No Internet features.

VALUE: Go for it.

Corel Corporation

613/728-8200

http://www.corel.com

List price: $695

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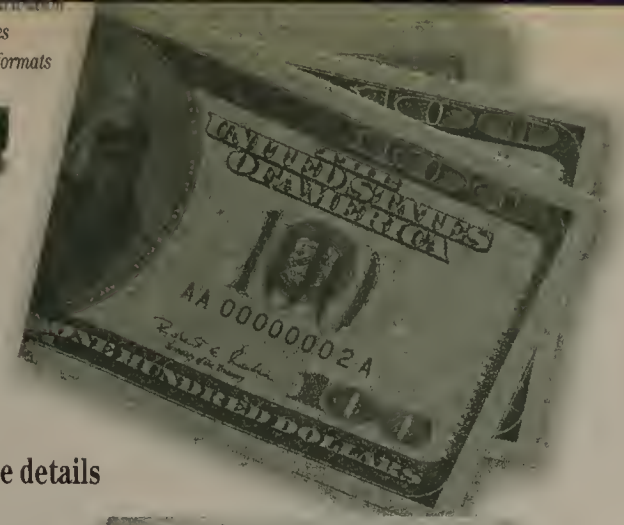

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S/A2

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Mail completed coupon along with proof-of-purchase materials to

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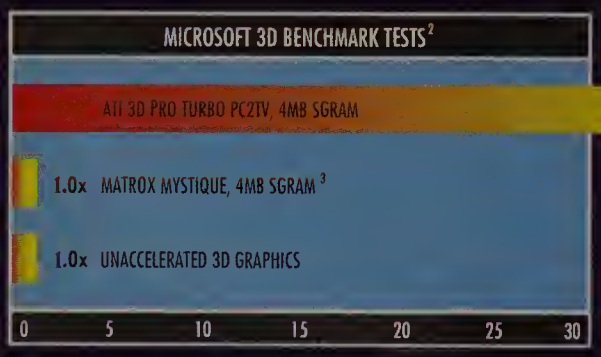
New ATI 3D graphics upgrades put

A WHOLE NEW SPIN

on the way you view your computer and watch TV.

Everywhere you look, eyes are popping and heads are spinning over the new ATI 3D PRO TURBO™ PC2TV and 3D XPRESSION™ PC2TV graphics upgrades. The only ones with the new *PC2TV* feature that uses your television set for big screen business presentations and awesome in-your-face game playing. The first ones that make it plug and play simple to get the best possible combination of 3D, 2D and full-screen video performance. With more high-end 3D features built right onto the board than you get from Matrox, Diamond or anyone else. With 16.7 million colors at 1280x1024 resolution, and the smoothest TV quality video playback you can get. Which means startling improvements in realism and response from multimedia, games, business apps and Web graphics. And both come with the ATI 3D Software Superpack that includes three of today's hottest 3D games absolutely free. Move up to the superior performance and resolution of ATI 3D upgrades. There's no better value around. See them now at your dealer or visit us at www.atitech.ca.

	ATI 3D XPRESSION PC2TV	MATROX MYSTIQUE	DIAMOND STEALTH 3D 2000XL	ATI 3D PRO TURBO PC2TV	MATROX MILLENNIUM
Output to TV	•			•	
1600 x 1200 (NI)	•			•	•
3D Texturing (Bilinear)	•		•	•	
Smooth Video	•	•		•	
Performance (WinMarks)[1]	40.7M	35.9M	33.6M	41.5M	37.7M
Price	$219 (2MB)	$219	$199	$349 (4MB)	$449



COMPARISON	3D XPRESSION PC2TV	3D PRO TURBO PC2TV
Use	Games, Home, Business	Power Users, Engineers, Graphics Professionals
Maximum 3D Resolution and Colors[4]	1024 x 768 @ 256	1600 x 1200 @ 256
Maximum Resolution	1600 x 1200 @ 60Hz	1600 x 1200 @ 75Hz
Memory	2MB or 4MB (2MB upgradable to 4MB)	4MB Upgradable to 6MB or 8MB

Also in systems from IBM, NEC, Sony, Acer, Gateway

NOW YOU SEE IT.™

© ATI Technologies Inc., 1996. ATI, 3D PRO TURBO, 3D XPRESSION and PC2TV are trademarks and/or registered trademarks of their respective manufacturers. 1. All performance tests conducted by ATI on a P5-200MHz system with 32MB EDO RAM, 256K cache. The 3D XPRESSION PC2TV, Matrox Mystique and Diamond Stealth 3D 2000 are configured with 2MB of memory and the 3D PRO TURBO PC2TV and Matrox Millennium with 4MB of memory, for PCI bus using driver release: 3.0, 1.0, 4.0, 3.0 and 2.2, respectively. WinBench tests conducted at 1024x768 resolution at 256 colors at 75Hz refresh under Windows 95. 2. Test conducted on a P5-75MHz system with Microsoft Tunnel Test in 640x480 resolution at 65K colors in bilinear. 3. Bilinear texturing not supported in hardware. 4. Double buffered with 16-bit Z-buffer.

Circle 5 on reader service card

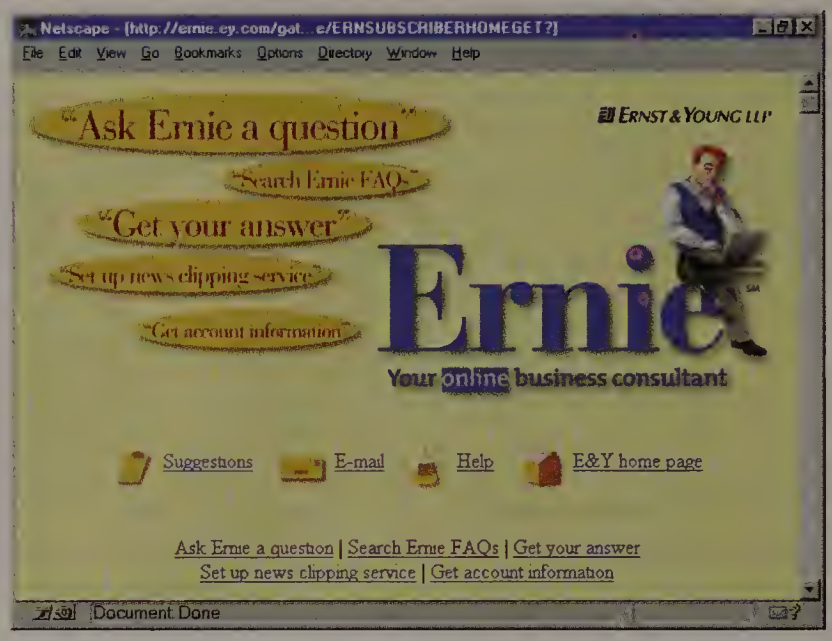
Online, World-Class Business Consultant

BUSINESS

IF YOUR COMPANY wants to hire a top-tier business consultant, it would normally spend $10,000 or more for a week-long engagement. But with **Ernie**—Ernst & Young's new online-based consulting service—your company can ask top consultants an unlimited number of questions for an annual subscription fee of $6000.

The Ernie service is designed for middle- and larger-size companies, typically with revenues between $25 million and $200 million. Here's how it works: As a subscribing client, you and your company's employees log on to Ernie via the Internet using your account passwords; you then choose from a variety of consulting services. To ask for help with a business problem, you choose a general topic (such as taxes, corporate finance, or human resources), then submit an electronic form containing your question and relevant background information.

Ernie routes your question to consultants through Ernst & Young's intranet and posts an answer to your e-mail account within two business days. Remarkably, you can submit as many new or follow-up queries as necessary. I visited the site using a guest account and obtained information on such issues as company valuation procedures and how to deal with embezzlement by employees.



ERNST & YOUNG'S ERNIE is an online-based service that provides personalized business advice from a top-tier consulting firm.

Ernie: Ernst & Young's Online Business Consultant

PROS: Unlimited business advice from world-class consultants.

CONS: Best for factual information, not for other kinds of advice.

VALUE: A real deal.

Ernst & Young LLP

800/892-1732

http://www.ernie.ey.com

List price: annual subscription $6000

READER SERVICE NO. 799

If your company often wants quick, expert facts from consultants, Ernie is a great value. Of course, Ernie doesn't give you all the benefits of face-to-face meetings.

—Richard Jantz

Improve Your Staff's Customer Service Skills

TRAINING

WE'VE ALL MET salespeople with bad attitudes—you know, the ones who pipe in with helpful comments like "I just work here." They could learn a thing or two from **Adventures in Service**, a whimsical customer service and sales training CD-ROM from Enterprise Media. This $495 program helps managers and their employees improve customer service skills.

You won't find any serious lectures in this playfully interactive program, which I reviewed in shipping form. It's filled with pleasant graphics, music, and video clips of sales guru Peter Glen. Using on-screen "automobile controls" to navigate the program, you take a simulated trip down the "customer service highway" on your journey to earn a license for successful sales. Separate trips are provided for managers and employees, with off-ramps for learning sales skills, taking quizzes, and joining brainstorming sessions.

If all this sounds a bit silly, it is at times—but that's intentional. Glen's daft delivery and colorful anecdotes about supercilious sales people and sales horror stories make the training sessions entertaining.

Unfortunately, the product's high price may appeal only to corporate sales departments. There's a $40 preview version available for the budget-minded. This 16-bit program runs under both Windows 3.*x* and Windows 95.

—Richard Jantz ▶

Adventures in Service: An Interactive Experience

PROS: Fun title teaches sales and customer service.

CONS: Expensive.

VALUE: Well-done, but too pricey.

Enterprise Media Inc.

800/423-6021

List price: $495

READER SERVICE NO. 800

QUICK TAKES

Fast Graphics

Is Windows 95 feeling sluggish? VideoLogic says its new 128-bit graphics accelerator, the **VideoLogic GrafixStar 600**, will speed up your multimedia PC's performance (it tops this month's Top 10 Graphics Boards chart). It uses 2.25MB worth of new memory chips called MDRAMs (Multibank DRAM) that are priced lower than the slower VRAM. The Plug and Play–compliant GrafixStar 600 supports resolutions of up to 1600 by 1200 and refresh rates up to 150 Hz. Street price is $200. VideoLogic, 415/875-0606.

READER SERVICE NO. 801

QUARTERDECK®

CrashShield™ Alone Could Cover the Cost of WINProbe™ 95

(Just Think of the Rest as a Bonus)

Prevent Crashes and Fatal Errors Automatically

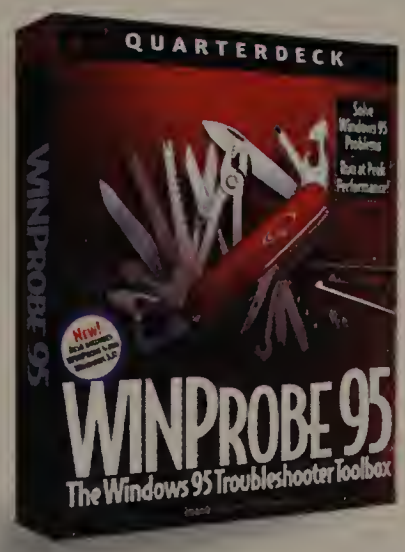
How many times has Windows 95 crashed on you? Can you *really* afford the downtime? Well, your worries are over at last. Because WINProbe 95's unique CrashShield works in the background, and intercepts fatal errors *before* they occur – and *before* you lose your work. But that's only the beginning of what WINProbe 95 has to offer you . . .

Diagnose Windows 95 Problems Using the Only Complete 32-bit Hardware Toolkit

You'll slash up to 50% off your PC repair costs by using over 200 comprehensive diagnostics – including non-destructive stress testing, automatic test logs and preventive maintenance. So, go ahead and run at peak performance! Test your system completely from within Windows, and get the answers you need to solve Windows 95 hardware problems in a flash.

Clean Up and Edit the Registry Safely

Reduce your start-up time and increase efficiency overall by scanning for invalid Windows 95 entries, and removing them easily and safely. Use WINProbe 95's *exclusive* Registry Guru™ to make editing your INI files and the Registry a snap!



Optimize Your PC's Performance

Control and improve system performance quickly and easily. Use WINProbe 95 to determine and re-assign individual application priorities, and speed-up important jobs. Plus, only WINProbe 95 features exclusive automatic recovery of lost or fragmented resources and memory!

Access Our Exclusive Knowledge Base

When Windows 95 help just isn't enough, simply click on the Knowledge Base. It offers a wealth of multimedia tune-up tips and how-to information on upgrading and repairing your computer.

Solve Problems Easily

Take control of your system! Quarterdeck's new WINProbe 95 is a state of the art, easy-to-use toolkit. You'll increase your productivity, and cut your downtime dramatically. To obtain WINProbe 95, your very own Windows 95 system toolkit, just visit the store nearest you – or simply call 1-800-683-6696!

Includes:
Full Version of WINProbe 4
for Windows 3.1 Users!
CD Certify Pro
A Complete CD-ROM Benchmarking and Diagnostic System!

Visit your nearest store or call (800) 683-6696 to order.

Ask for code 01078. Check out Quarterdeck's Web site @ http://www.quarterdeck.com/

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WebEx: Download Now, Hyperbrowse Later

UTILITY

EVEN WITH TODAY'S fastest modems, Web pages can take forever to download. **WebEx**, an offline browser utility, offers you relief from staring at the screen and pining for an ISDN line. It doesn't speed up downloads, but it lets you do other work while your PC downloads Web pages.

The software works well for the most part, though it takes a little patience at the beginning. You have to launch WebEx, and then let it launch your browser (either Netscape Navigator or Microsoft Internet Explorer). I was disconcerted when "http://webex .travsoft" popped up on my screen instead of the home page I had configured in my browser, and at first thought this was an external site that had somehow lifted my home page information. But it turned out that WebEx had just created a mini–Web server in my PC to smooth the transition between the offline and online worlds. This utility could use clearer and more complete documentation.

Otherwise, WebEx works fine. The program puts a small toolbar—called a *SurfBar*—on each Web page that you browse. The SurfBar notes whether the page is already stored locally (Offline), or not (Online). To store an online page and its links, just click a button. It's easy to customize storage options, such as whether to include audio and video clips along with text and images, and how much disk space to devote to the Web page. In addition, WebEx can detect changes to Web sites and update the modified pages on your system.

At less than $30, WebEx is priced reasonably.

—Bryan Hastings

USE WEBEX'S ever-present SurfBar (blue bar at top) to copy Web pages to your PC or view the directory of a stored site.

WebEx 1.0

PROS: Automates Web downloads.

CONS: Poor setup documentation.

VALUE: Handy and inexpensive.

Traveling Software

800/343-8080

http://www.travsoft.com

Street price: $30

READER SERVICE NO. 802

A Visual Display

Ever get frustrated when you're searching for an image at a photo stock company on the Web and can't find exactly what you need? PhotoDisc (http://www.photodisc.com) is now using a "visual information retrieval" engine from Virage (http://www.virage.com). The **Virage Image Engine** lets you look for photos by using image attributes. Virage asks people to rate picture attributes, such as color, texture, structure, and composition, and uses the ratings to help narrow your search. Virage is also used in Illustra's (http://www.illustra.com) object relational multimedia database. Virage, 415/573-3210.

READER SERVICE NO. 803

WiseWire Makes Web Searching More Effective

INTERNET

FOR HELP WITH Internet searching, consider Empirical Media's **WiseWire**, a free "personal surfing assistant." This smart filtering agent is designed to search out the Web sites that will be most useful to you. To try WiseWire, just go to the company's site (http://www.wisewire.com) and do a search.

WiseWire incorporates two artificial intelligence technologies: neural net and collaborative filtering. Neural net technology lets WiseWire use choices you make to develop a personal profile for you. Collaborative filtering helps WiseWire track the quality of sites as determined by other users. For example, WiseWire asks its users to rate sites they come across by clicking on an on-screen value meter that ranges from "interesting" to "boring." WiseWire saves these ratings and couples them with your personal profile to narrow your search to what may be more useful sites. I found WiseWire easy to work with, but remember, it's a Web site guide, not a bible, and the site ratings of others may not meet your needs.

Soon after this article appears, the vendor plans to introduce a premium WiseWire service (for about $5 per month) that provides added customizable options and more content.

Overall, WiseWire is a useful and innovative tool. And the price is right.

—Tracy Swedlow ▶

WiseWire

PROS: Finds Web sites suited to your tastes.

CONS: Others' ratings may not help you find what you want.

VALUE: The magic word is free.

Empirical Media

412/688-8870

http://www.wisewire.com

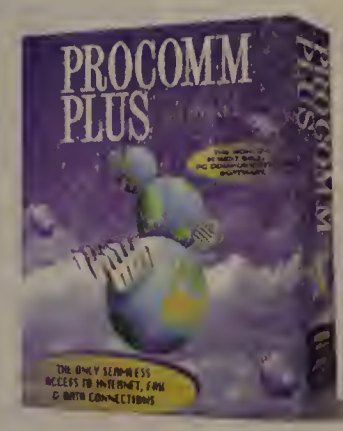
Street price: free

READER SERVICE NO. 804

QUARTERDECK®

Some people are more connected than others.

They access the Internet. They fax on-line. They download files. You can do all this and more with PROCOMM PLUS® 3.0 for Windows®. Our Connection Directory is the single source for all your data, fax, voice numbers, email, Web, Telnet, FTP and news entries. Just click on a directory entry and PROCOMM PLUS makes the connection. (*This is very cool.*) Our fax comes with Fax Manager, OCR and annotation tools. And data communications includes 36 terminal emulations–which means you can connect to all kinds of computer systems–plus all the most popular file transfer protocols. New PROCOMM PLUS 3.0 connects your connections. It's that simple. So call us at **1.800.474.1547** or check us out at **www.datastorm.com**.



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VERY CONNECTED

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Protect Your PC From Install Disasters

U T I L I T Y

QUALITAS'S $40 **C.Y.A.** (Cover Your Applications) insures you against the sometimes unfortunate changes that a new program may make to your computer's system files, including config.sys, .ini, and Windows 95's registry files. Should a new program destabilize your Windows 3.*x* or Win 95 system, C.Y.A. can reverse the changes and get you going again.

You can choose to put C.Y.A. in your Startup group; if you're running Windows 95, this option puts the C.Y.A. icon in the Taskbar tray.

Before you install a new application, click C.Y.A.'s Capture button to save copies of your PC's config.sys, autoexec.bat, win.ini., system.ini, and Windows 95's registry files (and other files as you like). You can capture multiple named sets of files. To be on the safe side, you should schedule captures often, perhaps every time Windows loads or every selected number of days.

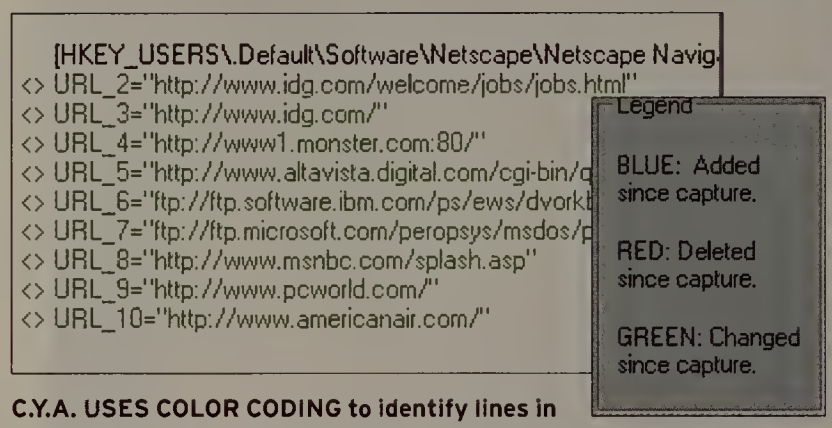
After installing a new application, click C.Y.A.'s Compare button to view the changes to your system files. Color coding makes it simple to examine differences. If you decide to reverse the changes, select a capture set and press the Restore button. Using a beta version of C.Y.A. running under Windows 95, we successfully captured system files, installed a Netscape Navigator 3.0 beta, compared the new registry files against the old, and restored the old files.

C.Y.A. has a clear interface that shows you what's going on at any given moment.

C.Y.A. gives novice and experienced Windows users valuable protection against wayward apps. System administrators will also find it a useful diagnostic tool. Just be sure to keep capturing those PC system files.

Still, C.Y.A. may be a bit pricey for individual users. For organizations, a corporate licensing program offers volume discounts.

—Shane Rau



C.Y.A. USES COLOR CODING to identify lines in Windows 95's registry files that changed when a new program was installed. You can then decide whether to restore the older files.

Qualitas C.Y.A.

PROS: Backs up and restores PC system files.

CONS: You must be vigilant about capturing files.

VALUE: A smart move.

Qualitas Inc.

301/907-6700

http://www.qualitas.com

Street price: $40

READER SERVICE NO. 807

QUICK TAKES

Back Up Your PC Online

Backing up data on your notebook PC may be the last thing on your mind—until you accidentally delete the major presentation you're supposed to deliver to your new investors. When tape backup isn't an option, you can stash critical data in an online "vault" with McAfee's **WebStor.** This Internet-based backup solution uses the Windows 95 Explorer interface to let you drag and drop documents from your PC to the storage icon. In the same way, you can retrieve documents 24 hours a day by logging into your own Internet service provider. In addition to the price of the software, you pay $10 a month to rent 30MB of space for your data. WebStor lists for $65. McAfee, 408/988-3832, http://www.mcafee.com.

READER SERVICE NO. 809

CodeBlue/2 Performs Windows 95 CPR

B A C K U P

IF YOU OWN a second hard disk or a removable storage drive, Tapedisk's $49 **CodeBlue/2** makes it less tedious to restore an entire Windows 95 environment after a PC disaster. It gets the job done, but you'll need a good deal of technical savvy to use the program. Even longtime PC users may find it too difficult.

CodeBlue/2 copies its own files to your main disk and creates the scripts and emergency DOS boot floppy that it will use to back up to and restore from your second disk. Although brief, the CodeBlue/2 installation requires you to be familiar with concepts such as batch files, hidden system files, and SCSI drivers; the lucid instructions and ample illustrations in CodeBlue/2's manual cannot compensate for a lack of experience in these areas. After installation, you work mostly in DOS, backing up and restoring your entire setup or selected directories, using long file names. Power users and support personnel will appreciate CodeBlue/2's automation of the disaster recovery process—but novice PC users with a single hard drive and people who are squeamish about batch files should pass on this program.

—Shane Rau ▶

CodeBlue/2

PROS: Automates Windows 95 disaster recovery.

CONS: Not for PC novices.

VALUE: More pain than gain.

Tapedisk

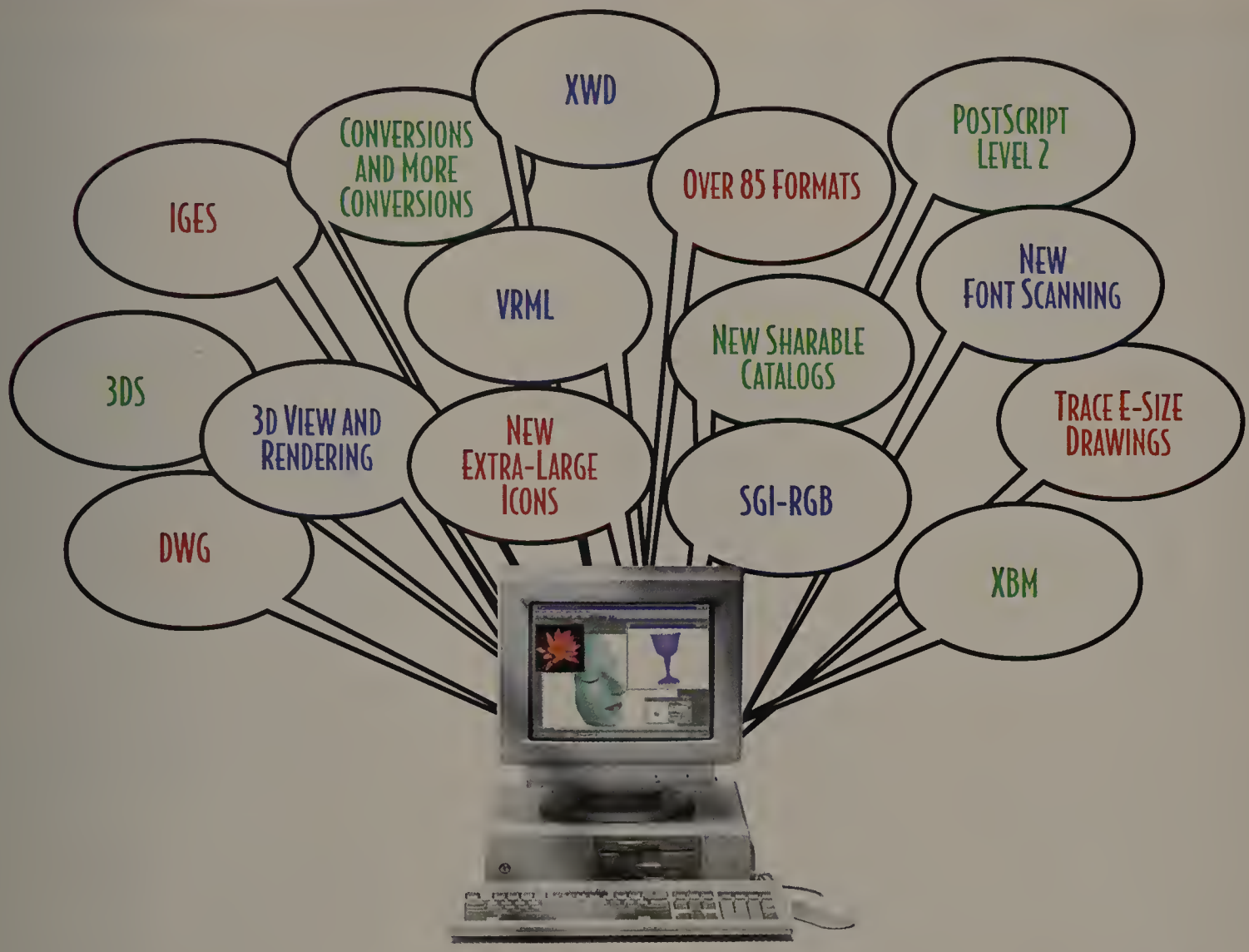
800/827-3372, 715/235-3388

http://www.tapedisk.com

Street price: $49

READER SERVICE NO. 808

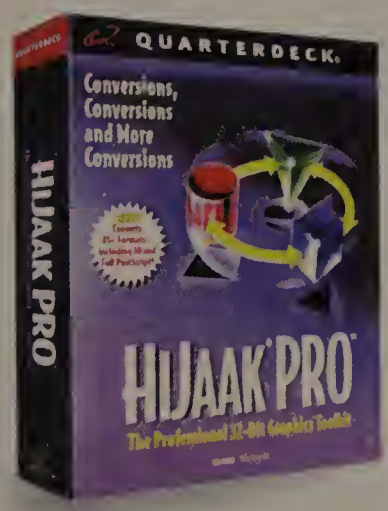
QUARTERDECK®



CONVERT IT WITH HIJAAK® PRO™!

HiJaak PRO 4.0 is the professional 32-bit graphics toolkit for users working with Windows 95. It features top quality, fast image conversion, trace, and screen capture in over 85 raster, vector and metafile formats. It supports graphics view, print, find, enhance, thumbnail, catalog, browse and scan.

HiJaak PRO now also supports full PostScript Level 2 and five of the most common 3D formats: DXF, DWG, IGES, 3DS and VRML. HiJaak PRO makes it easy to accomplish any graphics task by providing shortcut menu access to HiJaak's most common graphics functions. Using HiJaak PRO, engineers can scan, trace, and catalog their legacy blueprints; graphics designers can thumbnail, organize, import, and enhance their clip art and convert incompatible files; and technical writers can take top quality screen captures and import them into any desktop publisher.



View 3D formats with user-selectable Point of View, and render 3D images in wireframe, flat, or gouraud shading. Using *MDI,* HiJaak PRO enables viewing of multiple images simultaneously. With the new font scanning utility feature, fonts that do not automatically register with Windows can be found and utilized. And with new support for extra large icons, you get thumbnails of images which are rich in detail and easy to see in the Windows 95 Explorer.

Call us at 1-800-683-6696 and ask for code 01200, or check out our website at http://www.quarterdeck.com/

Visit your nearest store or call (800) 683-6696 to order. Ask for code 01200.

COMPUSA THE COMPUTER SUPERSTORE® · COMPUTER City · EGGHEAD · ELECTRONICS Fry's · MICRO CENTER

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Designed for Microsoft Windows 95

intel inside pentium® PROCESSOR

Best Pentium processor-based PC at entry-level price.

- Intel 75 or 100 MHz Pentium processor
- 8–16MB RAM, expandable to 128MB
- EDO RAM
- Optional 256KB cache
- 640MB** high-performance Enhanced-IDE hard drive
- PCI integrated graphics accelerator and 1MB DRAM standard, upgradable to 2MB
- Flash BIOS for easy upgrade
- Designed for Windows® 95
- Preloaded HP DMI Desktop Management Interface
- Free three-year limited warranty for parts and labor[1]

from $1,262*

HP Vectra VE

Best managed PC.

- Intel 75, 100, 120, 133, 150 or 166 MHz Pentium processor
- LAN Remote Power
- PCI integrated 32-bit 10Base-T Ethernet interface
- Network certified and preconfigured for Microsoft® and Novell clients
- Preloaded HP DMI Desktop Management Interface
- Vectra Op-Center
- Norton Smart Disk Doctor
- Parallel transfer driver preinstalled for faster LAN packet processing
- Advanced security meeting C2 level
- 64-bit graphics accelerator on PCI bus
- 1MB video RAM, expandable to 2MB
- 8 or 16MB EDO RAM, expandable to 128MB
- 840 or 1280MB Enhanced-IDE hard drive
- 4 mass storage shelves (3 front accessible), 4 expansion slots
- Two 32-bit PCI slots
- Flash BIOS for easy upgrade
- Designed for Windows 95
- Free three-year limited warranty for parts and labor[1]

from $1,513*

HP Vectra XM

Leading Pentium processor/PCI performance at an affordable price.

- Intel 100, 120, 133, 150 or 166 MHz Pentium processor
- Desktop and minitower packages
- 256KB burst synchronous cache
- 8–16MB RAM, expandable to 128MB
- EDO RAM
- PCI/ISA architecture
- 640MB** high-performance Enhanced-IDE hard drive
- PCI integrated graphics accelerator and 1MB DRAM standard, upgradable to 2MB or Matrox Millenium PCI graphics card with 3D acceleration and 2MB WRAM, upgradable to 8MB
- Flash BIOS for easy upgrade
- Full plug-and-play capability
- Designed for Windows 95
- Preloaded HP DMI Desktop Management Interface
- Free three-year limited warranty for parts and labor[1]

from $1,415*

HP Vectra VL

PC MAGAZINE EDITORS' CHOICE
February 20, 1996
HP Vectra XU 6/150

[1]In Canada, call 1-800-387-3867. *Average U.S. street price. Monitor not included. **Other capacities available. HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11; or Windows OS/2 or Windows NT included. [1]First year, on-site, 24-hour, next-day service. Second and third year, return to dealer. Microsoft, MS-DOS, Windows and Windows NT are U.S. registered trademarks of Microsoft Corporation. Pentium and the Intel Inside logo are registered trademarks of Intel Corporation. OS/2 is a registered trademark of the International Business Machines Corporation.
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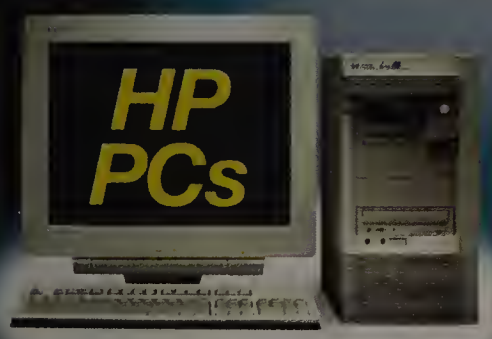
The ultimate PC.

- Intel Pentium Pro 150, 180 or 200 MHz processor with 256KB integrated cache
- Supports dual processing with secondary Pentium Pro socket
- 128-bit high-performance memory architecture
- 16–32MB ECC DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion slots
- PCI integrated Ultra SCSI Fast 20 interface with 20MB/s throughput
- 1,000MB** SCSI-2 high-performance hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- 10Base-T/100VG AnyLAN selectable PCI NIC with up to 100 Mb/s throughput
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT® 3.51
- Free three-year limited warranty for parts and labor[1]

from $3,939*

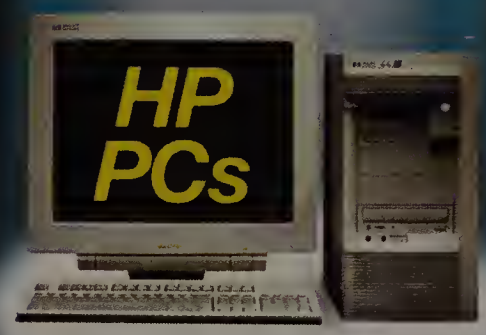


HP Vectra XU

Exceptional performance and expandability at an affordable price.

- Intel Pentium Pro 150 MHz processor with 256KB integrated cache
- 128-bit high-performance memory architecture
- 16 MB DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion sockets
- 1,000MB** Enhanced-IDE hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2® Warp
- Free three-year limited warranty for parts and labor[1]

from $2,615*



HP Vectra VT

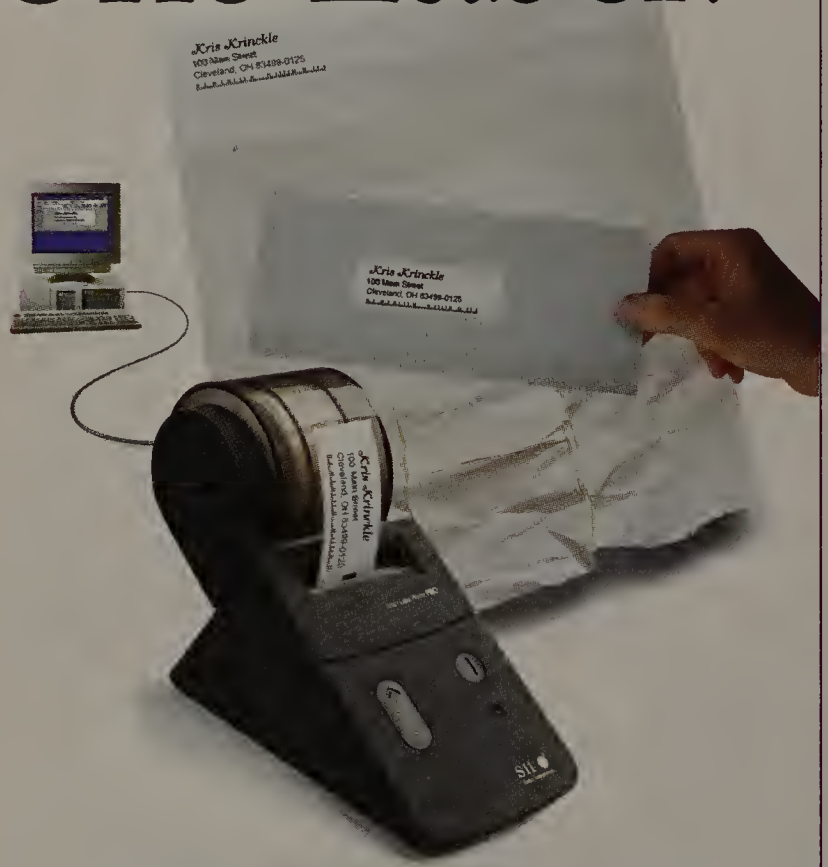
Helpful hint:

Rip out and pin up next to Compaq and IBM ads.

A little comparison shopping will quickly show you that HP puts the best prices on the most impressive PCs. One standout is the network-ready Vectra XM. It's configured for the most demanding networks with LAN Remote Power, Super-fast LAN install and HP Vectra Op-Center for more effective remote management. Every Vectra will outshine the competition when it comes to features and price. From the Pentium® processor-based PCs to the dual Pentium Pro processor-based HP Vectra XU PC. For more information or the name of your nearest HP reseller, call 1-800-322-HPPC, Ext. 1704! Or visit us at http://www.hp.com/go/vectra.

HEWLETT® PACKARD

"Can't I Print Just One Label?"



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Circle 188 on reader service card

AV Master Capture Board

VIDEO BOARD

FAST ELECTRONIC, a long-time player in the video capture board arena, has unveiled the $999 **AV Master**, a PCI bus-master board that captures 30 frames or 60 fields per second at 640 by 480 resolution. The AV Master is one of the best-performing capture boards in its price range: It has the ability to compress to a 4:1 ratio, using a standard Fast/Wide SCSI hard disk, and to output .avi file final results back to videotape. Compared to similar video boards, the AV Master has, as its main advantages, built-in audio capabilities and speed.

The AV Master features two notable improvements. The first is an ability to capture CD-quality audio at up to 44 kHz. You don't have to worry about IRQ conflicts, as you do with some other products, and your audio and video always stay synchronized.

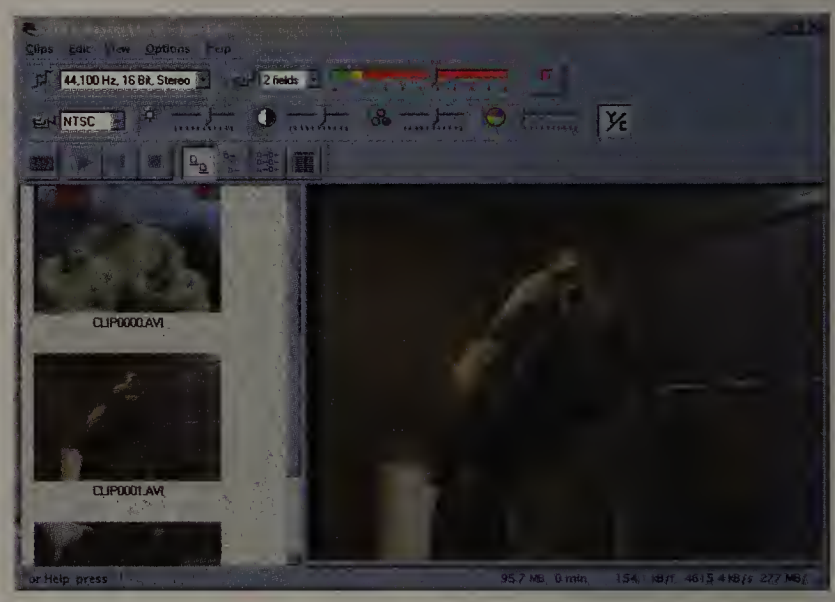
Second, new caching software dramatically improves video playback performance by buffering the running video stream through RAM.

The AV Master also includes such software as a copy of MediaStudio Pro 2.5 VE (a 32-bit video editor) and Crystal Flying Fonts Pro 3.01 LE (a 3-D animation title generator).

I tested the AV Master using a Pentium-166 PC with 16MB of RAM, an Adaptec AHA 2940W SCSI card, and a Promax external disk drive with an internal 4.3GB Conner 4207E Fast and Wide SCSI drive. Working with a complex test video, I was able to digitize and play back a 3-minute clip at 4.1MB per second. The picture quality looked great, and the sound remained in sync.

This high-end board stands out in its class of competitors.

—Richard Popko ▶



MASTERPIECE THEATRE: The AV Master video capture card offers speedy performance, plus audio capability on board.

AV Master

PROS: Captures video and sound; excellent performance.

CONS: Pricey.

VALUE: Good, if you need the speed.

Fast Electronic
800/684-6684
Street price: $999

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Walter Payton as photographed by Lee Crum.

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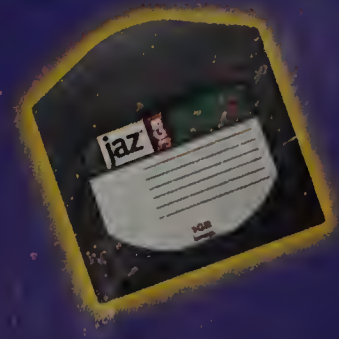

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PC WORLD

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Give Our Regards to Broadway

VIDEO CARD

TODAY ANYONE CAN capture full-motion video on a PC for use in multimedia presentations, training videos, or entertainment. But uncompressed video can eat up tons of hard disk space. The best quality of video compression in PCs is considered to be MPEG-1, but an MPEG encoder usually costs thousands of dollars. Data Translation's $995 **Broadway** board is the first sub-$1000 video capture and MPEG-1 compression card on the market—and it's incredibly easy to use.

This PCI board is Plug and Play–ready, so installing it is a snap. Cords for connecting to a VCR or camcorder are included. Setup takes about 10 minutes.

Creating the MPEG clips is also easy—launch the Broadway software, start up your video source, and press the Capture button. If you want to edit the clip using the bundled Ulead MediaStudio software, you have to save it as an .avi file before compressing it. Remember, you'll need a lot of disk space. A 1-minute, uncompressed .avi file will take up to 60MB, and the MPEG file 12MB more. It takes 4 minutes to compress a 1-minute .avi clip if you set the compression quality on high.

One catch: The Broadway board doesn't give you a way to view your MPEG clips. Luckily, most graphics boards now come with MPEG playback software. To really enjoy MPEG clips with such software, you need at least a Pentium-133—otherwise the video can become choppy as you enlarge the video window on screen. But even on my Pentium-75 PC, image and sound quality were excellent, though audio-video synchronization was a bit off. Overall, the Broadway card is an easy, cost-efficient way to create MPEG-1 video files.

—Brad Grimes ■

Broadway

PROS: First sub-$1000 video capture card with MPEG-1 compression.

CONS: No playback software.

VALUE: We want it.

Data Translation

508/481-3700

List price: $995

READER SERVICE NO. 811

QUICK TAKES

Speed-Up for Serial Ports

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Grandparents enjoying their new Quantex Video Phone PC

Sound like incredible magic? It is. And the magician is Quantex, working side-by-side with Intel to bring you the first Video Phoning available on a home PC! Previously available only to large businesses, Video Phone is now standard fare with the Quantex QP5/VM-1 System. Video and voice over a single, plain old telephone wire. No installation struggles, and meticulously engineered for your Quantex machine to give you true "plug and play" performance. Amazing, don't you agree?

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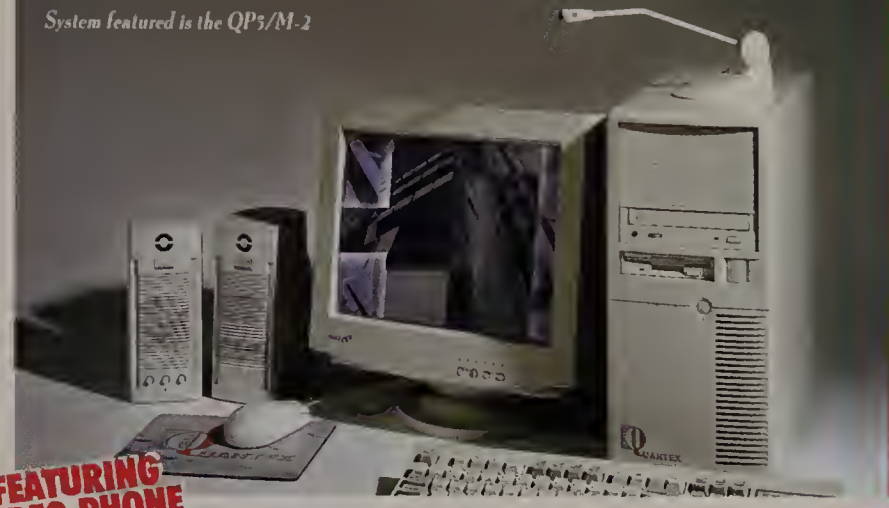

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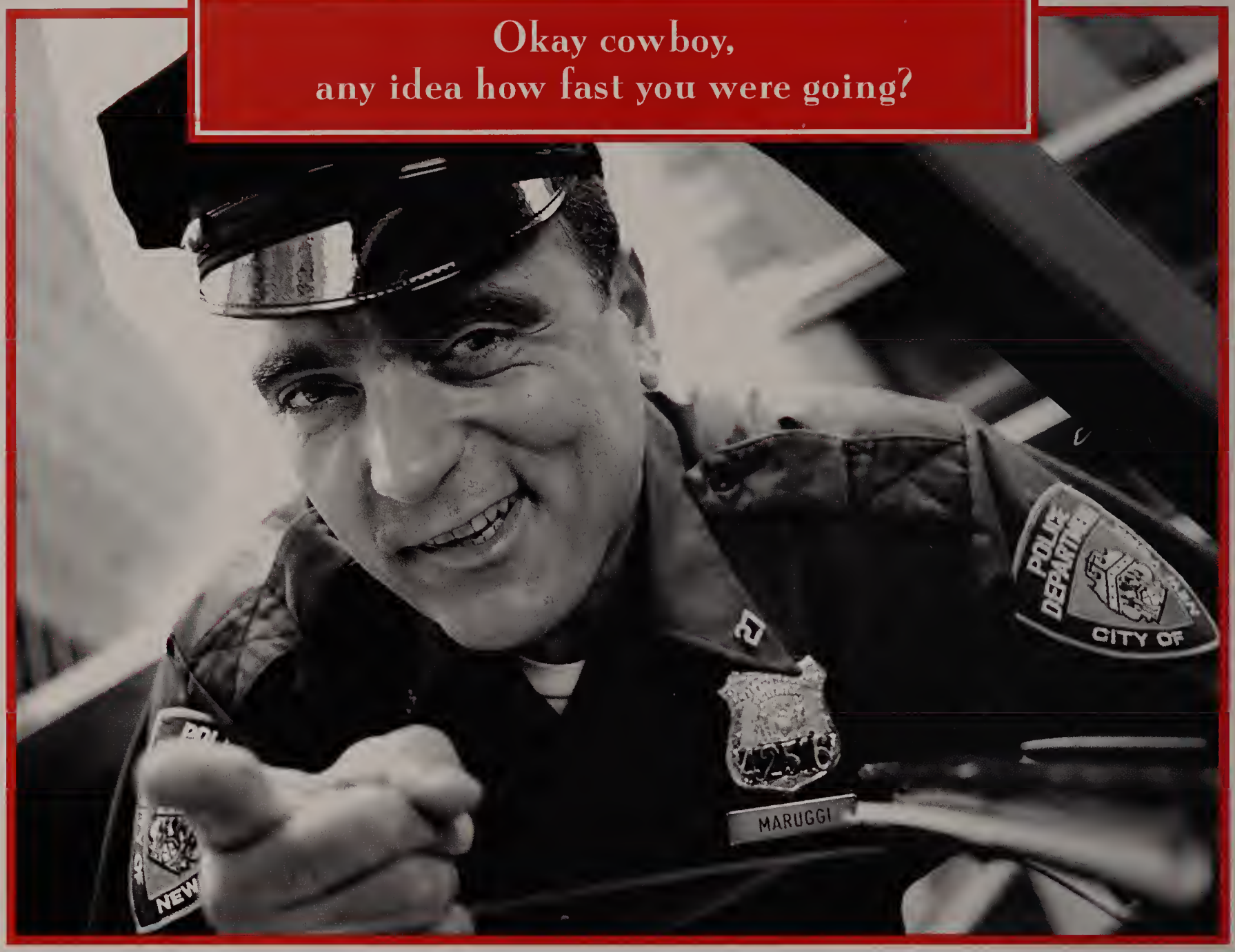

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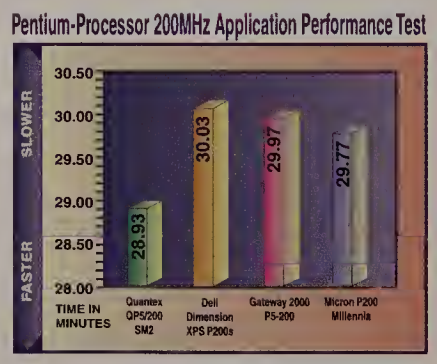

**Based on the combined test times of the following applications: Word 7.0, Excel 7.0, Picture Publisher 6.0, Paradox 5.0, WordPerfect 6.1 and 1-2-3 release 5. Tests conducted by PC World, July, 1996 issue.*

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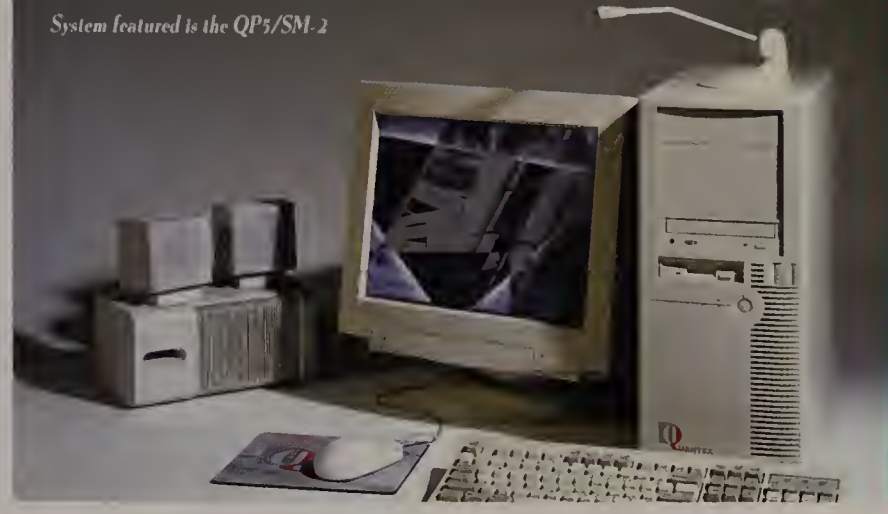

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- 3.5" 1.44MB Floppy Drive
- Matrox MGA Millennium 64-Bit 3D w/2MB WRAM
- MAG 17".25dp Digital Monitor (w/SONY Trinitron Tube)
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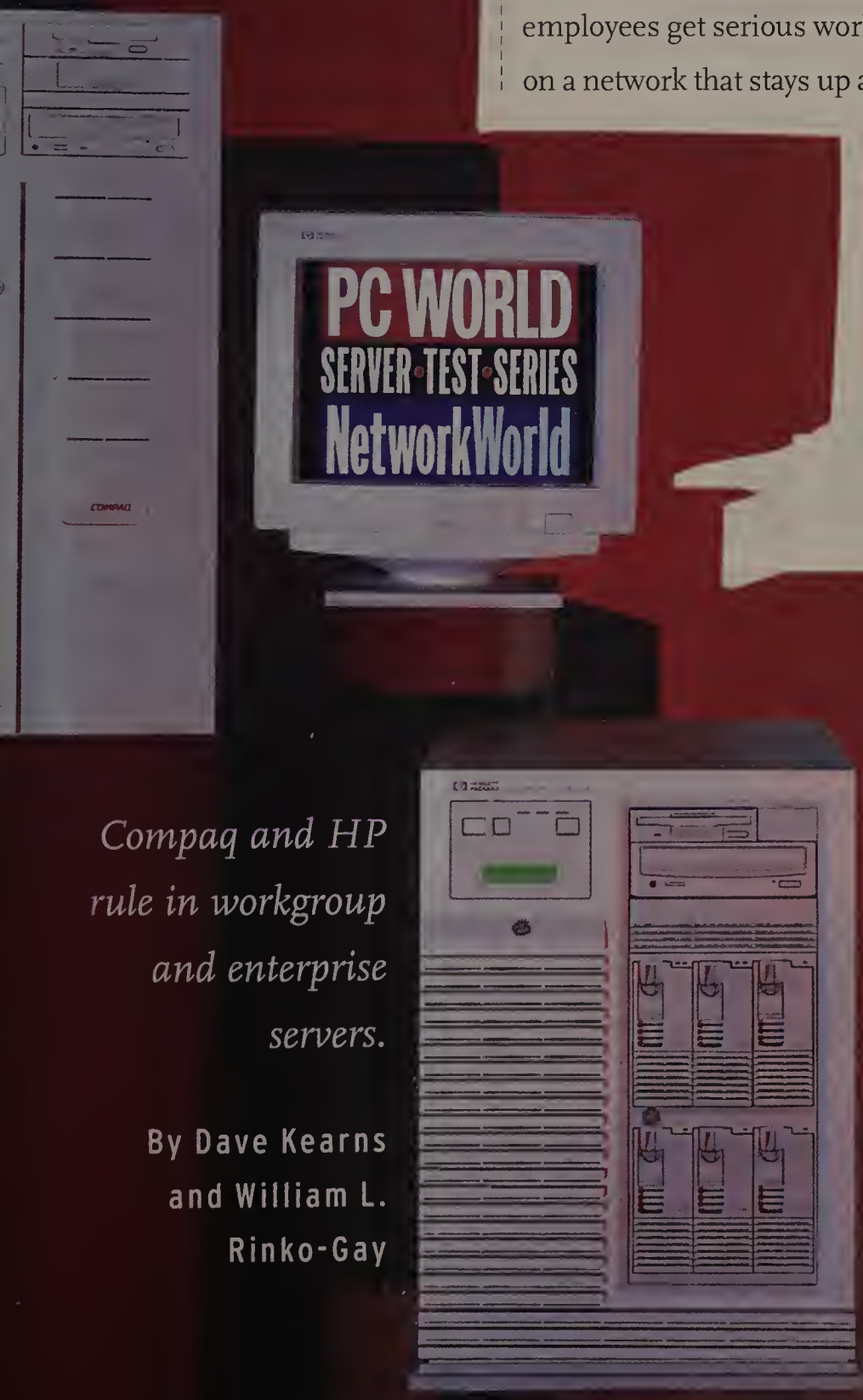
TOP 10 NETWORK SERVERS



NETWORK SERVERS aren't built to run Windows 95. They *are* built to let dozens or hundreds of employees get serious work done on a network that stays up around the clock, and they're highly specialized for that purpose. So it's not surprising that half of this month's Top 10 servers come from manufacturers famous for their big-iron products.

We divide our reviews into Top 5 workgroup and Top 5 enterprise servers. The workgroup servers typically come with a single CPU, 32MB of memory, a single network adapter, and less than 5GB of disk space. The enterprise ▶

Compaq and HP rule in workgroup and enterprise servers.

By Dave Kearns and William L. Rinko-Gay

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BEST BUYS: The Compaq ProLiant 1500 Model 5/133-2100 remains top workgroup server. HP's NetServer 5/166 LS4 wins enterprise honors.

PHOTOGRAPH PIERRE-YVES GOAVEC

servers offer impressive big-iron specifications, with up to four processors, four network adapters, at least 64MB of memory (128MB for four processors), and typically more than 5GB of hard drive capacity.

We rate each product on a combination of performance, features, price, reliability, and service and support. See PC World Online (http://www.pcworld.com) for expanded reviews and for reviews of the Best of the Rest servers (not covered here), plus details on testing procedures, performance results, features tables, and other key buying information.

WORKGROUP SERVERS

1. COMPAQ PROLIANT 1500 MODEL 5/133-2100

PROS: Excellent performance and tools

CONS: Premium price

THIS MACHINE HAS IT ALL—the best performance we've seen in a workgroup server, good expandability, clean design, hot-swappable drives, and Compaq's leading-edge software installation tools and server management package.

The ProLiant trailed only the Prioris HX on our file service tests and beat all comers in our application benchmarks.

The model we tested cost $7555 and came with a 133-MHz Pentium upgradable to two CPUs on the processor card, and two hot-swappable 2.1GB Seagate Barracuda drives. It's nicely designed. The lockable front cover swings open to provide access to five hot-plug drive bays. You also get easy access to slots, SIMMs, and processor sockets.

2. DIGITAL PRIORIS XL 5133

PROS: Very good performance, inexpensive

CONS: Limited expandability

DIGITAL EQUIPMENT Corporation's Prioris XL 5133 is well engineered, fast, bundled with solid software tools, and backed by Digital's worldwide support group. It's a very good value at $5650.

The Prioris XL runs just behind the Compaq in almost all performance tests. The model we reviewed came with a 133-MHz Pentium upgradable to a dual-processor configuration, and two 2.1GB Seagate Barracuda drives with a Fast & Wide SCSI-2 disk controller from Adaptec. The drives are not hot-pluggable but can be removed easily.

3. HP NETSERVER 5/133 LH

PROS: Good performance and expandability

CONS: Higher price than some rivals

THIS FORMER BEST BUY workgroup server offers an impressive mix of performance, features, and software tools, but at $7242 it's not looking cheap.

The NetServer 5/133 LH comes with a Pentium-133 CPU, four Seagate 1.05GB SCSI drives, and two integrated SCSI controllers. On the file service tests, the NetServer came in close behind its Compaq and Digital XL rivals.

The NetServer box is large, short, and squat. The inside is nicely organized. Its hard drives are all hot-swappable. It has room for four drives, lots of open slots, a well-stocked CD-ROM kit, and strong server management tools.

PC WORLD

TOP 10 SERVERS

	WORKGROUP SERVERS	Overall rating	Street price	CPU/ RAM (MB)	Hard drives/ individual capacity (GB)	Comments	Reader service number
1	Compaq ProLiant 1500 Model 5/133-2100 800/345-1518	91	$7555	P-133/32	2/2.1	Excellent performance, clean design, hot-swappable drives.	631
2	Digital Prioris XL 5133 800/722-9332	90	$5650	P-133/32	2/2.1	Very good performance, strong software tools, inexpensive.	632
3	HP NetServer 5/133 LH 800/322-4772	89	$7242	P-133/32	4/1.05	Good file service speed and expandability.	633
4	Digital Prioris HX 5166 800/722-9332	87	$8450	P-166/32	2/2.1	Strong high-reliability options, poor application performance.	634
5	Acer AcerAltos 900 408/432-6200	83	$4810	P-133/32	1/2.1	Tiny, excellent price, poor file service performance.	635
	ENTERPRISE SERVERS						
1	HP NetServer 5/166 LS4 800/322-4772	92	$20,238	4 P-166/128	4/2.1	Top performance, newly aggressive pricing, good design.	636
2	IBM PC Server 720 800/426-3333	91	$26,000	4 P-133/128	6/2.25	Excellent performance and upgradability.	–
3	ALR Revolution Quad6 166/512 714/581-6770	90	$30,499	4 PPro-166/128	9/2.15	Blazing database speed, high-reliability features, expandable.	637
4	Panda Project Archistrat 4S 800/566-6987	86	$20,210	1 P-166/64	9/2.1	Uniquely upgradable, offbeat design, expensive.	638
5	Tangent Carthage 800/800-5550	81	$5595	1 P-166/64	2/2.15	Very inexpensive, good high-reliability features, slow.	639

Best Buy

HOW WE TEST For a description of our tests, see PC World Online (http://www.pcworld.com).

4. DIGITAL PRIORIS HX 5166

PROS: Top file service performance, good design

CONS: Slow application performance, high price

THE HX IS very similar to the second-place Prioris XL, but the model we tested came with a Pentium-166 CPU upgradable to dual Pentium-200 chips, and other enhancements. Priced at $8450, $2800 more than the XL, it had an edge in features and reliability but was essentially equal in overall performance. While the HX was the clear leader in file service performance, it placed a dismal fifth in application performance.

The extra money primarily gets you a host of features designed for redundant operation. The Mylex DAC960 disk adapter allows for RAID5 capability with up to 476GB of disk space. The minitower offers plenty of room and easy access, except that the hot-pluggable drives are difficult to remove.

5. ACER ACERALTOS 900

PROS: Good database performance, great price

CONS: Limited expandability, slow file service

AS SERVERS GO, this one is tiny. Inside is a desktop PC on steroids, with the only server-specific hardware being an internal Adaptec SCSI controller, Error Checking/Correcting memory, and a chassis lock. There isn't much room for hard drive expansion.

At $4810, however, the AcerAltos has a very attractive price, and it turned in the best Oracle database performance under Windows NT, although its file service performance was very poor. The model we tested came with a Pentium-133, a 512K secondary cache, and one 2.1GB Seagate Barracuda drive.

ENTERPRISE SERVERS

1. HP NETSERVER 5/166 LS4

PROS: Top performance, good design

CONS: No free PCI slots as tested

OVERALL, THIS NETSERVER is the fastest enterprise network server we've tested to date—even including those with four Pentium Pros. With its price slashed from $29,410 to $20,238, it rates a Best Buy.

The system we reviewed held four Pentium-166 CPUs (each with 1MB of secondary cache) on two cards, 128MB of ECC memory expandable to 768MB, and four (expandable to six) hot-swappable 2.1GB Seagate Barracuda drives. All six PCI slots are taken up by the four HP 100Base-T network adapters and the two integrated Adaptec SCSI adapters.

2. IBM PC SERVER 720

PROS: Excellent performance and upgradability

CONS: CD-ROM drive is on its side

IF YOU WANT EXPANDABILITY, IBM's PC Server 720 has it in spades. The model we tested, priced at $26,000, came with four Pentium-133 processors (each with 512K of secondary cache), 128MB of memory, and 13.5GB of storage in six 2.25GB Quantum Atlas drives. You can go up to six CPUs, 1GB of memory, and over 100GB of storage.

HP'S PENTIUM-BASED NETSERVER 5/166 LS4 IS STILL THE FASTEST SERVER WE'VE TESTED—QUICKER OVERALL ON OUR TESTS THAN ITS NEW PENTIUM PRO RIVALS.

The IBM came in third in overall performance behind HP's NetServer 5/166 LS4 and the ALR Revolution.

It comes with hot-swappable drives, ECC memory, and support for RAID5 fault-tolerant operation in hardware. The PC Server's chassis is well laid out, but the CD-ROM drive is mounted sideways. You must remove a plastic cage to change SIMMs or processors, and the cage is difficult to reinstall. Software tools are excellent.

3. ALR REVOLUTION QUAD6 166/512

PROS: High database speed, very expandable

CONS: High price, lacks software tools

THIS FOUR-PROCESSOR Pentium Pro-166 machine is a great application server. It's also well designed, outfitted with RAID support and other high-reliability features, and is extremely expandable and easily serviced. But it costs $30,499, didn't excel at file service, and lacks a complete suite of software tools.

On the model we tested, each CPU included 512K of on-chip secondary cache. We tested it with 128MB of ECC memory (expandable to no less than 2GB) and nine 2.15GB Conner drives. The disk controller comes with 8MB of memory, supports RAID0 or RAID5, and handles three SCSI channels; each channel can connect to 16 SCSI devices.

4. PANDA PROJECT ARCHISTRAT 4S

PROS: Uniquely upgradable

CONS: Expensive, lacks high-reliability features

THE PANDA PROJECT Archistrat 4S's key feature is a modular system design based on the company's proprietary Compass connector. It aims to let you upgrade to your choice of processors, processor buses, and other major system components. But the Archistrat costs $20,210, lacks high-reliability features, locks you into upgrade boards supporting that proprietary connector, is hard to service, suffers from annoying faults, and is full of slick goodies you don't really need. The machine we tested came with one Pentium-166, 64MB of memory, and nine Seagate Barracuda 2.1GB hard drives for total storage of 18.9GB.

5. TANGENT CARTHAGE

PROS: Inexpensive, high-reliability features

CONS: Slow overall, no open PCI slots as tested

THIS MACHINE COMBINES a number of attractive features with the extremely low price of $5595, but it was at the bottom of the performance range for enterprise servers. It came with a Pentium-166 upgradable to dual Pentiums, 64MB of memory expandable to 512MB, and two 2.15GB Quantum drives, with seven internal drive bays available. ■

Dave Kearns is a network consultant and writer in Austin, Texas. William L. Rinko-Gay directs the Network World–PC World Network Test Center.

For more information about all products in this article, circle reader service no. 700.

Intranet Applications Challenge Notes

How does the first groupware for your company's intranet stack up against Lotus Notes?

By Mike Hogan

ONE RECENT SUNNY morning you awoke to find yourself living by the I-Way. At work and at play, you enjoy cheap access to a global network that's all about collaborating and sharing stuff and that doesn't much care what computer you use. Small wonder, then, that businesses are now furiously building their own internal intranets with the very same technology, and that just about every software developer on the planet is constructing tools for exploiting this new frontier.

MIN CHRISTOPHERSON, a certified Lotus Notes developer, chose Web tools to share project schedules and product information on TravelNet's intranet.

This mountain of intranet software is rising toward Lotus Notes—the package that defined group collaboration but has always been expensive and difficult to install and maintain. Will these new packages underprice, overshadow, and drown out Notes? The quick answer is no—they're not quite ready for prime time. But Notes is finally getting some real competition, which will benefit any organization with an intranet.

LEVERAGING YOUR NET ADVANTAGE

IF YOU AND YOUR COWORKERS are browsing the World Wide Web from the office, you've already got much of the infrastructure necessary for a company intranet. Most important, you're already using the right client software. It's then a manageable (but by no means trouble-free) hop for your organization to set up a Web page that publishes key internal information. Once that's accomplished, you've got a platform to deliver a slew of other group applications as well.

And you won't be locked into one vendor for any of it. Microsoft and Netscape have both announced grand plans for legions of Web servers that eventually will match Notes function for function. You can buy a few packages, such as OpenText's LiveLink and Radnet's WebShare, that try to go head-to-head with Notes for building any application you need, but you're also free to mix and match packages that offer whatever slice of Notes' functionality you want.

For example, Digital Equipment Corporation offers versions of its AltaVista Internet search engine so that a company can use the engine to find and index materials on the Internet and intranets. And Action Technologies' Action WorkFlow Metro is an application development platform with an array of inter- ▶

SEVEN TIPS FOR YOUR INTRANET

THE RUSH IS ON FOR INTRANETS—miniature companywide versions of the Internet that can tap the wealth of Internet software and services and help you work better with other employees, suppliers, and customers. Here are tips for building an intranet and getting the most from it.

- **GET THE RIGHT ADDRESS.** Make sure your firm gets an official Internet address from your service provider and assigns specific host addresses to all your intranet systems, even if you don't currently plan to connect your network to the Net. That day will come.
- **IT'S CHEAP BUT IT AIN'T FREE.** Look for hidden costs, such as setting up your PCs. Even if they're already configured for dial-up Internet access, you may need to reconfigure them to work over a local area network.
- **UPGRADE TO WINDOWS 95.** It's far better with net and intranet software than Windows 3.*x*.
- **LOCK IT UP.** Require passwords and make employees use them. Set up an approved method of dialing in to the network from off-site locations before employees do it for themselves.
- **KEEP IT SIMPLE.** Intranet applications should work for anyone with a Web browser and access to your intranet server. Keep applications simple so that any browser will work.
- **STOP AND RELOAD.** When you're on the intranet, reload pages frequently to make sure you're getting recent updates.
- **YOU GET WHAT YOU PAY FOR.** It's relatively simple to publish corporate information or set up a basic discussion forum, but delivering mission-critical work-flow applications à la Notes demands a heavy investment of time for all employees who are affected. —*Pete Loshin*

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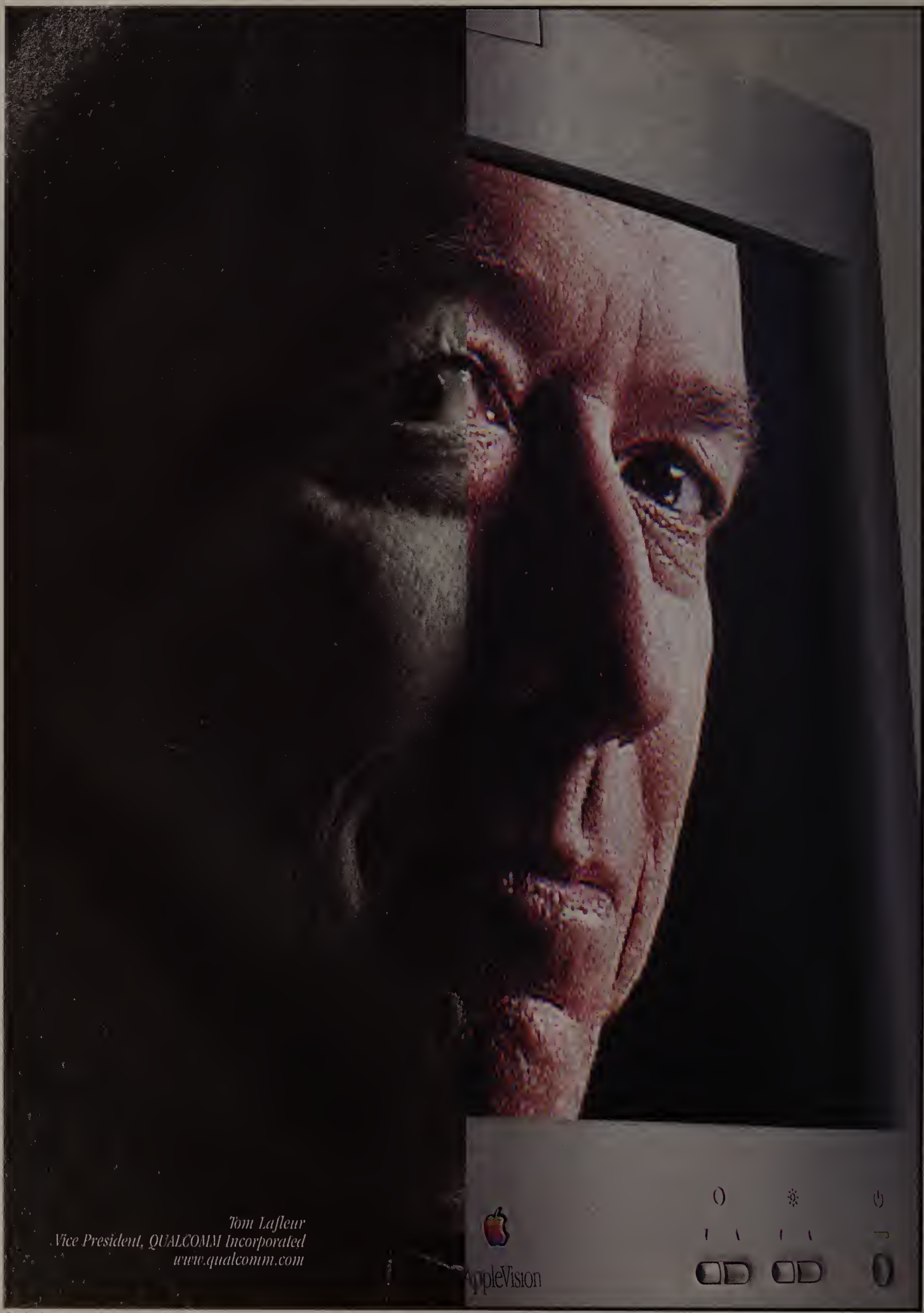

Tom Lafleur
Vice President, QUALCOMM Incorporated
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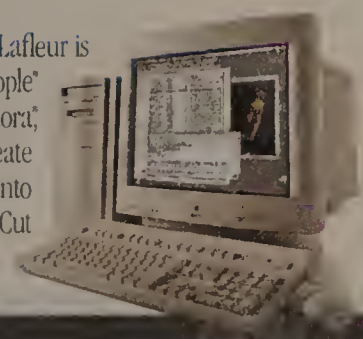

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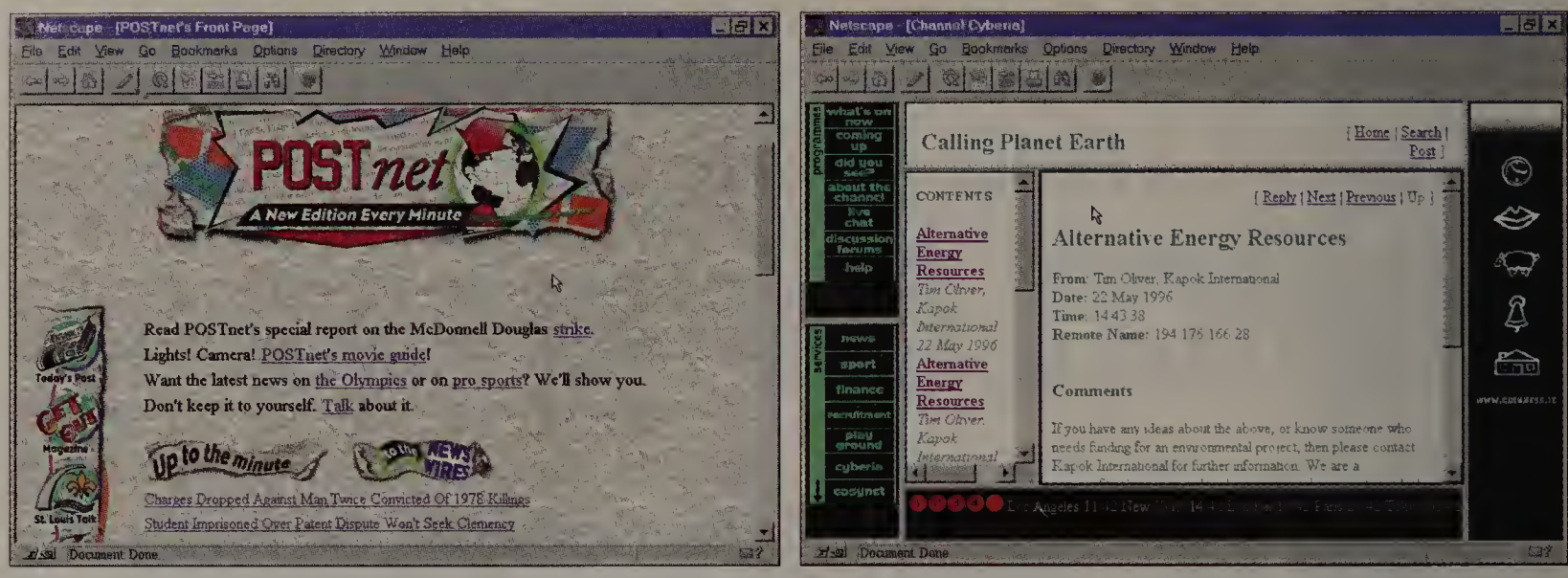


QUICK–WHICH IS THE WEB SERVER AND WHICH IS NOTES? The lines are blurring between Web servers and Lotus Notes, as Web servers add group tools such as discussion forums, and Notes adds the ability to deliver slick Web presentations. That makes both well suited for many intranet tasks. A Notes 4.5 server handles the interactive newspaper on the left, while Microsoft's Interactive Information Server hosts the discussion on the right.

active templates for routing and tracking customer requests that come in through a company's Web page.

The prospect of lower prices and greater flexibility appealed to TravelNet, a Santa Clara, California–based developer of travel information systems. TravelNet stores project schedules and product information in a Sybase SQL Server database, and then shares it with customers on its intranet, which runs the University of Illinois NCSA Webserver 1.5 on a Sun Sparcstation using the Solaris operating system.

"Notes is a better groupware product, but intranet software is a good value to the companies that do not have to commit an initial investment," says TravelNet customer support manager Min Christopherson, a certified Notes developer. "This is a tremendous benefit for small to medium-size companies." As Christopherson points out, he's free to add the applications and services he wants, when he wants, and pay for these as he goes along. "Also, the client platform is a lot easier to deploy."

Of course, front-end costs are just a fraction of the eventual investment in an intranet. Surveys by Creative Networks in Palo Alto, California, found that it costs around $109,000 to start up and support the average Web server for a year. This price is in the same range as that of a similar Notes-based system.

Michael Osterman, market research director for Creative Networks, emphasizes that these are mostly "people" costs that are difficult to quantify and that vary widely among companies.

GROUP PLATFORMS MOVE ONTO THE WEB

LOTUS IS JOINING the battle right on the Web, hoping to turn Notes into your Web server—but one with many powerful extras (see "Notes Meets the Intranet," August). Today's Notes add-ons provide seamless Web links that let non-Notes users browse Notes documents, fill out Notes forms, update Notes databases, and search documents with Notes' search engine. This fall Notes 4.5 will do a much slicker job, delivering either Notes or Web documents on demand.

"Lotus believes that connectivity to the Web is crucial to the expansion of the Notes user base," says Gary Bedrosian, business development manager for The Registry, a developer in Stratham, Massachusetts. "They are listening very carefully and acting very quickly."

Microsoft is pursuing a similar strategy, with plans to Web-enable its Exchange messaging server and just about every other product the company ships. Microsoft offers some off-the-shelf groupware capabilities through Exchange, and plans to publish documents from Exchange to its Interactive Information Server. Likewise, Novell has added important enhancements to its upcoming Groupwise 5.0 environment and tuned it for Web access.

The choice comes down to how much intranet you're willing to pay for and how much you're willing to build yourself, says Richard H. Schwartz, whose RHS Consulting in Nashua, New Hampshire, designs intranets.

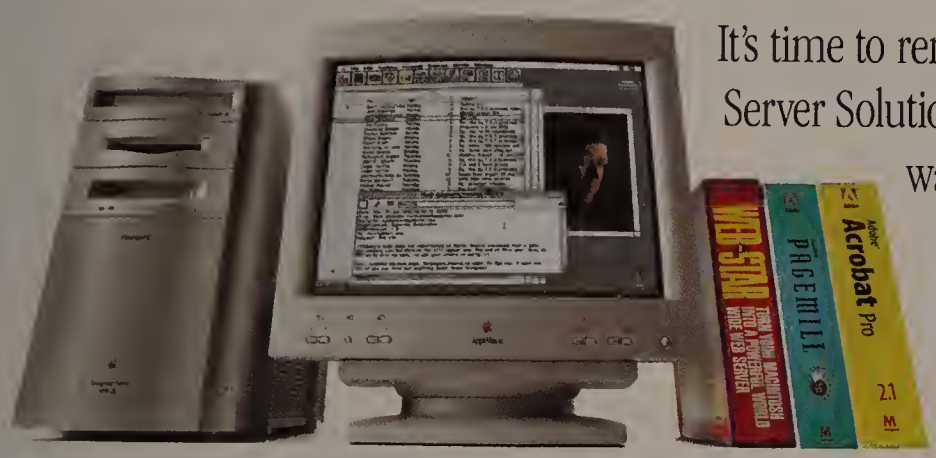
If you have just one or two problems to solve, you can probably save money by going with intranet tools, Schwartz figures. But if your plans are more ambitious, "Notes has a six-year lead in functionality for interactive groupware applications," he adds. "Many companies that are problem oriented end up with a hodgepodge of solutions. And most of what you save in Notes licensing fees, you can end up spending in application development."

Brad Meinert, Internet analyst with Input, of Mountain View, California, responds that the average intranet application is a short-lived response to a company challenge often best served by a quickly built custom Web solution.

The bottom line: Notes is a known quantity and is generally far more powerful, polished, reliable, and scalable than its new intranet rivals. But their entry will inevitably produce more choices and lower prices for everyone on an intranet. ■

Mike Hogan is a longtime contributor to PC World. *Pete Loshin is an Internet consultant in Watertown, Massachusetts.*

START REPLACING WALLS WITH WORDS.



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On a quest for the perfect tattoo

I immediately found an ideal viper motif on the Tattoo Resource Page, yet I was curious what Maximillian's On-Line Tattoo Parlor might suggest — which actually expanded my thinking into the pterodactyl realm. Intrigued, I went on to peruse the Design Your Own Tattoo Page and — influenced by a well-stenciled midriff from the Bowery on the History of the Tattoo Web Site — came up with something no one had done before. In fact, everyone on the Tattoo Talk chat page was going ga-ga over it. So I started thinking tattoos might be my calling, when I scrolled down to a Web site for the Ministry of the Tattoo in Monterey, where the entire parish is visibly tattooed. Just one potluck dinner and **I ended up finding God.**

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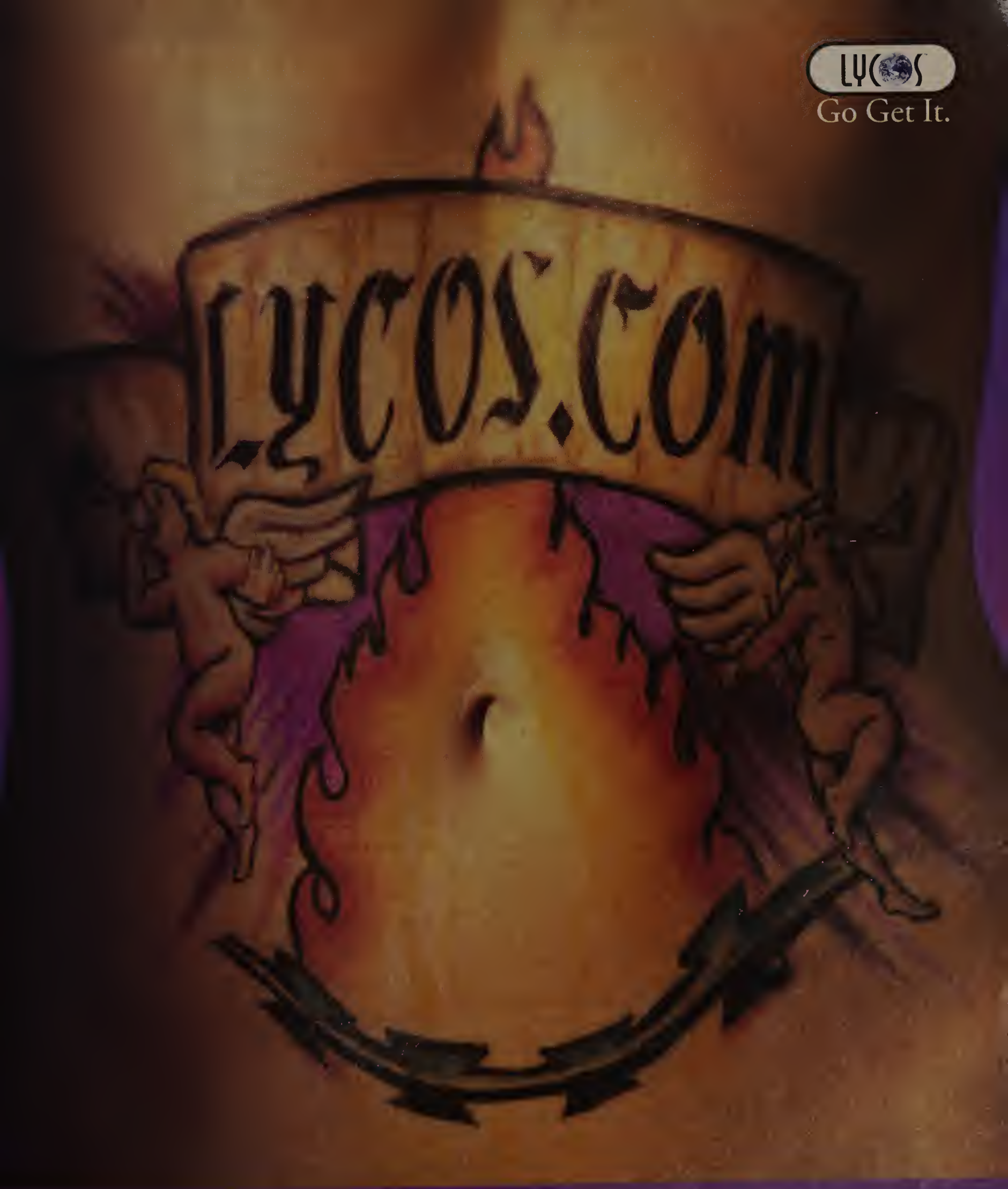

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Get Your Group on the Same Page

FRONTPAGE 1.1

FrontPage 1.1 offers simple workgroup applications for your intranet.

By Pete Loshin

THE LEAST EXPENSIVE groupware product around is the corkboard hanging in your lobby. But for a little more money, Microsoft FrontPage 1.1 will help you set up simple workgroup applications on your corporate intranet.

Street priced at $149, FrontPage is a popular Web site designer; it lets you easily create nice-looking pages with FrontPage Editor and build impressive sites using FrontPage Explorer. It also comes with canned versions of rudimentary customer support, project collaboration, and discussion group applications that you can get up and running in just a few hours. You don't need to know programming or HTML, but read the online tutorial because FrontPage tools are not always intuitive.

FrontPage installs easily, and automatically identifies your PC's Internet Protocol address and host name. You can use the bundled Personal Web server or load special extensions to use FrontPage with other Web servers. Some extensions are bundled; others can be downloaded from Microsoft's FrontPage site (http://www.microsoft.com/frontpage/).

GETTING GROUPS GOING

ONCE YOU'VE INSTALLED the package, you can build your first Web application by opening FrontPage Explorer, choosing *New Web* from the *File* pull-down menu, and choosing a template or wizard.

The Discussion Web Wizard lets you create a basic forum for group discussions, with easy-to-follow threaded conversations and text searching for all messages. That's about all you get, though. Users can't expand or collapse threads or attach files, and replies to a message don't include the original message text. The wizard prompts you for the necessary information, and you can launch a usable discussion forum in well under an hour. You can spend a lot more time customizing the forum, but your options are limited.

The Customer Support and Project templates let you create complete applications for holding discussions and publishing or grabbing information. For example, you can take a customer problem report and store it in various file formats that you can then feed into a database or spreadsheet. You can create your own forms or modify existing ones with FrontPage Editor, but follow the tutorial carefully before making your first attempt.

While FrontPage's wizards can generate complete and usable applications, you must modify them to reflect your organization's content. For instance, you need to add your company name, and you should insert the proper material for "What's New" and FAQ pages. And don't forget about security, which is handled through FrontPage Explorer. You can specify administrators, authors, and end users for each application and allow modifications from another computer if desired.

Overall, FrontPage can get you going with group applications on your intranet. And if you can read and follow instructions, you can get started by yourself. ■

FrontPage 1.1

PRO: Easy to use

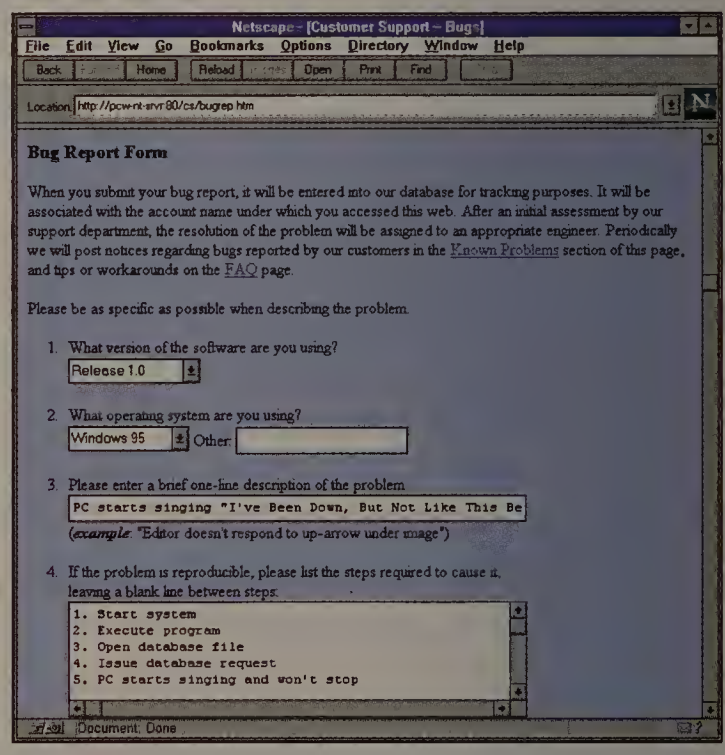
CON: Very limited group tools

Microsoft Corp.

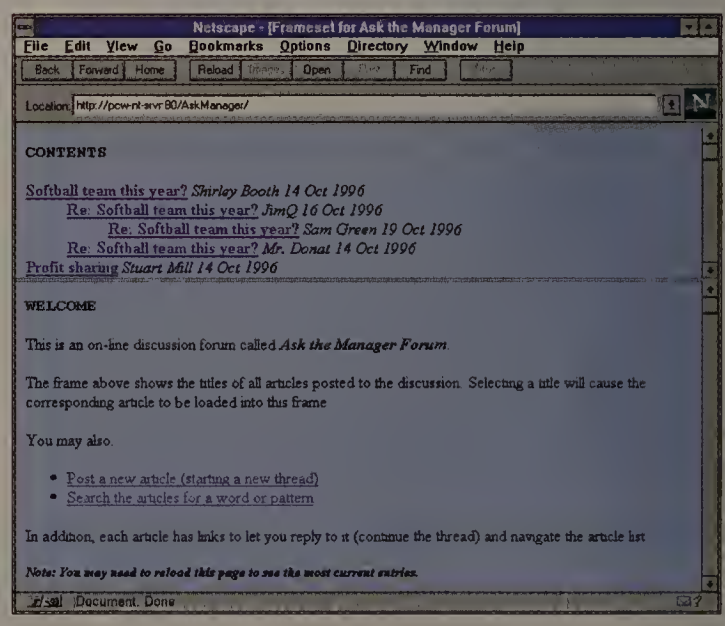
206/882-8080; http://www.microsoft.com

Street price: $149; $40 rebate to Office 95 users

READER SERVICE NO. 769



THE CUSTOMER SUPPORT TEMPLATE includes this bug report form, which you can easily modify to pick up other kinds of information from customers.



A NO-FRILLS DISCUSSION FORUM handles online conversations but lacks amenities such as the ability to attach files to your messages.

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Circle 174 on reader service card

Microsoft Windows NT Workstation 4.0

has the ease of
It has the power

It ha

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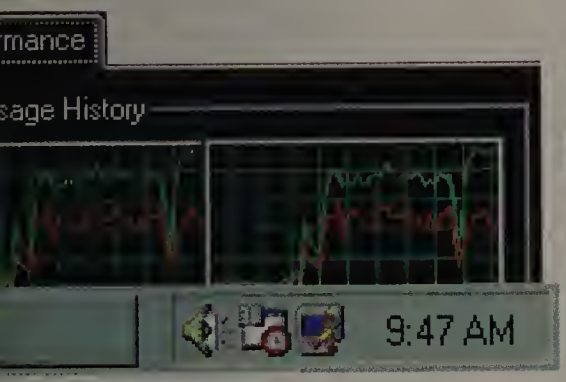
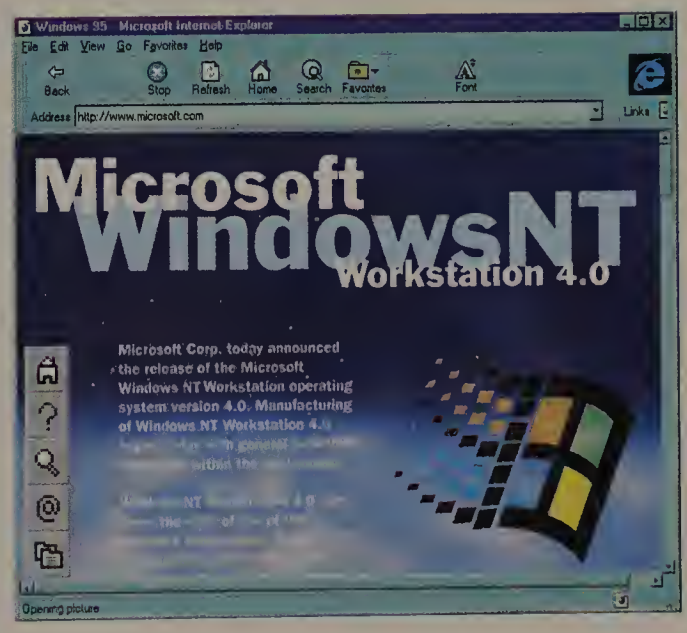
Windows 95.
of Windows NT.
computers everywhere drooling.





The new Windows NT® Workstation 4.0 operating system has been designed to be the most powerful desktop operating system. And because all that power is controlled by the Windows® 95 interface, it's much easier to use. The total 32-bit power of Windows NT Workstation means reliability, security, and easy access to the Internet and ıtranet. It's reliable because all applications run in their own memory space — so that new game beta won't crash last week's work. It's secure because integrated features let you lock your system all the way down to the file level, so you can count on applications and data being safe.

It's Internet-ready because it's loaded with built-in features like TCP/IP, the Microsoft Internet Explorer browser, and integrated Peer Web Services, which lets you create a small intranet for your workgroup. And because it's all controlled by the Windows 95 interface, you can customize your system to work and look however you like. So does all this mean Windows 95 is history? Absolutely not. Windows 95 may still be your best choice, depending on your existing hardware and applications. We suggest you dive headfirst into our Web site to compare and contrast operating systems to see which 32-bit desktop is best for you.

Microsoft®

Where do you want to go today?™ www.microsoft.com/ntworkstation/

A Suite Solution for Intranets

WEBSHARE

WebShare offers a complete tool kit for group applications on a Web server.

By Pete Loshin

"ON THE INTERNET, nobody knows if you're a dog." But on the intranet, *everyone* will know if your corporate Web site is a dog. And your site *will* be a dog if all it does is push official corporate data rather than help you get work done with your colleagues.

You can avoid this problem with Radnet's WebShare, an intranet workgroup product that lets you collaborate on a wide range of everyday projects—just as Lotus Notes does, but without the special infrastructure that Notes requires.

WebShare is an application platform, based on a SQL database engine, that lets sophisticated users and programmers create a broad range of structured applications. Developing these applications requires familiarity with HTML, BASIC, and SQL database design. On the infrastructure side, however, WebShare needs nothing but standard Internet-style networks and servers.

WebShare comes in two pieces. The $995 WebShare Designer is a development tool that also includes eight standard workgroup applications: a calendar system, a contact manager, an employee database, a manager for resources (such as conference rooms), two discussion group applications, a newsletter, and a problem tracker. The $2195 WebShare Server integrates a Spyglass Web server with a Sybase SQL database engine to deliver your intranet applications to anyone who can access the server machine. Both packages run on Windows NT workstations or servers with at least 32MB of memory; WebShare users can employ any Web browser. We tested late-beta versions of the software.

ADORNING THE TEMPLATES

INSTALLING WEBSHARE DESIGNER from a CD-ROM is quick; you just need to know the Internet Protocol addresses of any computers that will be logging in. That restriction disappears when you install WebShare Server.

You'll find that using WebShare's template applications is surprisingly easy, because the overall design is so simple and logical. However, the package is a little rough around the edges. The on-screen help is minimal, and some templates seem unfinished. For example, the calendar application lacks anything that looks like a regular calendar.

But you don't use these applications right out of the box. WebShare aims to create custom applications, and it does a creditable job. You start by dragging and dropping one of WebShare's template icons to the application window and giving it a name. You then open it up in WebShare Designer, a visual tool for adding and modifying HTML forms, database views, tables, and the rest of your application's plumbing. Designer comes with a BASIC scripting language to handle the job.

WebShare features a rich set of options for presenting different slices of data to different users. An administrator can easily create a user group, modify permissions, and generate private views of databases.

If you're interested in hard-core workgroup computing—and can invest programming time—WebShare can make your intranet a site to behold. ■

WebShare

PRO: Solid tool for creating many flavors of customized group applications

CON: Lacks polish, templates are limited

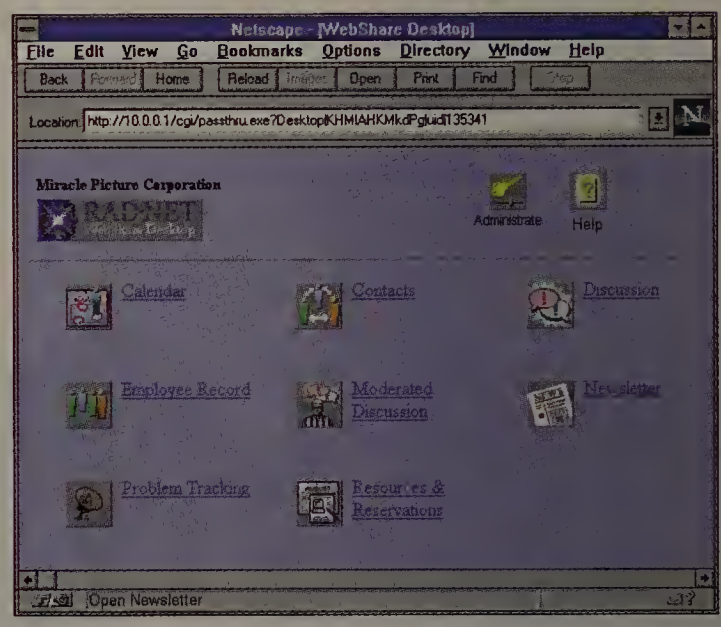
Radnet, Inc.

800/472-3638

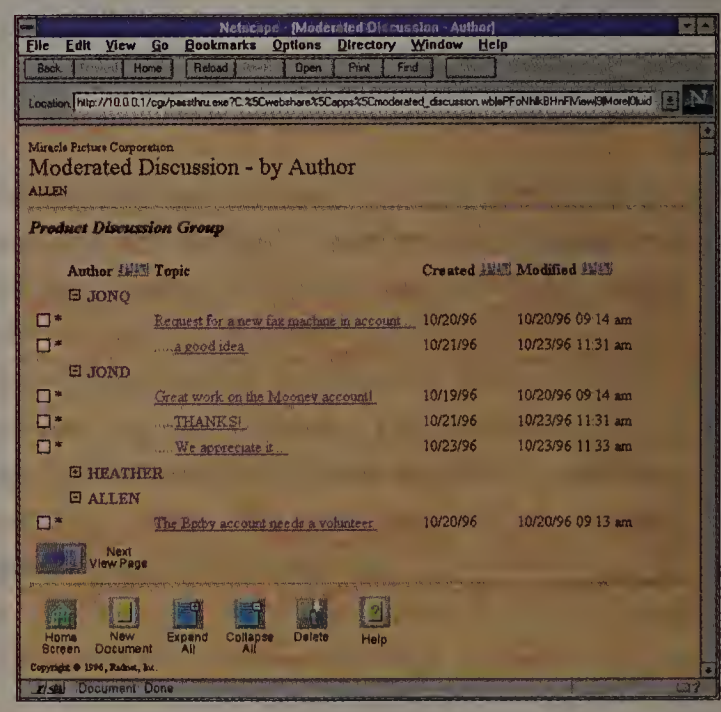
http://www.radnet.com

Street price: WebShare Designer $995, WebShare Server $2195

READER SERVICE NO. 770



WEBSHARE BUNDLES EIGHT TEMPLATE APPLICATIONS to help developers get started on group applications.



THIS DISCUSSION FORUM allows you to attach files to messages, a trick that most Web packages can't match.

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NETWORK COMPUTING EDITOR'S CHOICE

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PC World 10/96

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Brands of UPS used? _____

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◯ End User
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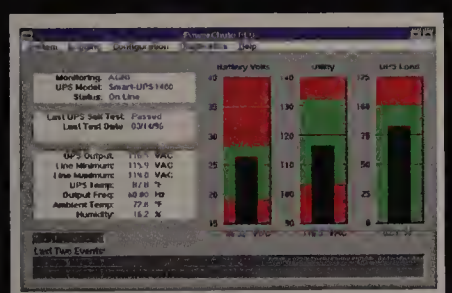

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Circle 17 on reader service card

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intel inside pentium PROCESSOR

Designed for Microsoft® Windows®95

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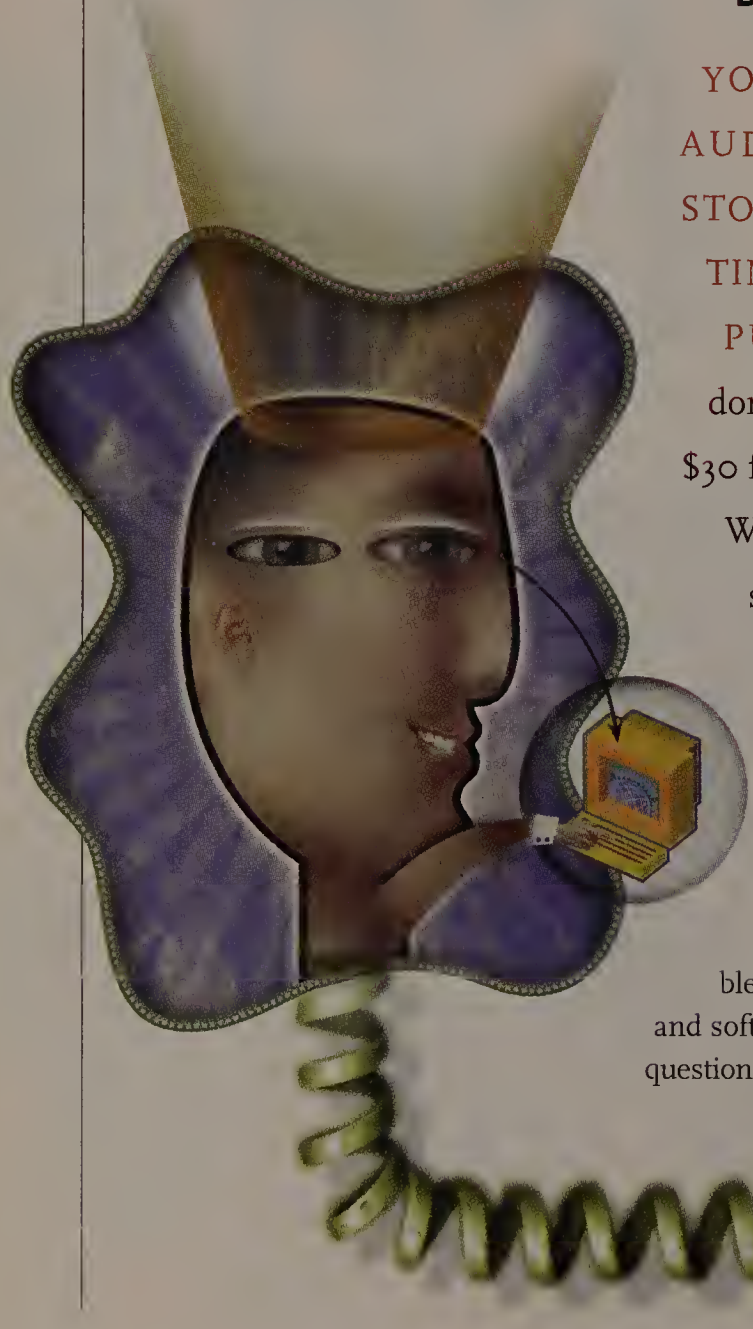
THE COMPLETE GUIDE TO FREE HELP ONLINE

BY KIRK STEERS



YOU CAN'T GET YOUR CD-ROM DRIVE TO PLAY AUDIO DISCS. YOUR MONITOR HAS SUDDENLY STOPPED DISPLAYING AT HIGH RESOLUTION. EVERY TIME YOU RUN THE SPELLING CHECKER, YOUR COMPUTER REBOOTS. So what do you do? What you've always done: Call technical support. Only now you discover there's a hefty $30 fee for solving your problem. Yikes!

While some hardware and software vendors still offer free phone support, most now charge for each call. And even the "free" support isn't really free, especially when you factor in those long toll-call waits on hold listening to Kenny G. Fortunately, on the Internet and online services you can still get answers to your questions, and in most cases it won't cost you a dime.

Nearly every major company's Web site now features a support page with answers to your technical questions. Most include answers to frequently asked questions, knowledge bases containing loads of troubleshooting and product information, and file libraries with updated drivers and software patches. And if you want help from an expert, you can usually post a question on a message board or send an e-mail to a company tech support person. ▶

HOW TO GET GREAT TECH SUPPORT ONLINE WITHOUT SPENDING A DIME.

130 Online Troubleshooting 101: Don't Panic

131 Webbing It: So Many Resources, so Little Time

131 FAQs

132 Knowledge Bases

133 E-Mail

134 Newsgroups (User Forums)

135 File Libraries

136 Usenet: All the Newsgroups That Fit

132 Four Easy Steps to Knowledge

133 Get the Right Advice the First Time

134 What Price, Gloria? Phone Versus Online Support

136 Online Alternatives to the Web

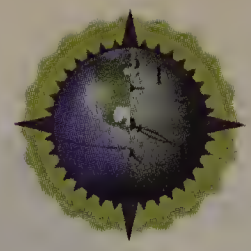
137 Help Yourself!

139 Free Pullout Online Directory for Major Companies

ILLUSTRATIONS BY KEVIN CURRY

There is a catch, of course. Hunting down the right answers can take hours (or even days) of online exploration. Just figuring out where to start can be a daunting task. And once you find a promising Web site or vendor forum you'll still need to know how and where to look. Downloading the wrong file or poorly phrasing an e-mail question can slow you down—or even get you an incorrect answer.

To help you cut through the online clutter and confusion, we searched major hardware and software companies and support sites on America Online, CompuServe, and the Internet. Here's a guide to where to go, what to look for, and how to get the right answer the first time you ask. And we've included a convenient pull-out card on page 139 with online support addresses.



ONLINE TROUBLESHOOTING 101: DON'T PANIC

GOING ONLINE FOR SUPPORT takes time, patience, and a do-it-yourself attitude. The first step is to consider your needs. If you can't print out your tax statement and the IRS is waiting in the lobby, or if you really need someone to guide you step by step, then telephone support is probably the better choice. And if the problem is with your modem or communications software, it may be your only choice.

Before you seek out tech support, try to determine the source of the trouble. Sometimes this is easy: If there's smoke coming out

ONLINE TECH SUPPORT

	INTERNET					COMPUSERVE			
SOFTWARE	Web address (http://...)	Newsgroup	E-mail	Knowledge base	Software/ file library	FAQ	Go word	Message board	Software/ file library	FAQ
Corel	www.corel.com, www.wordperfect.com	○	○	●	●	●	corel	●	●	●
Intuit	www.intuit.com	○	○	○	●	●	intuit	●	●	●
Lotus	www.support.lotus.com	●	●	●	●	●	lotus	●	●	●
Microsoft	www.microsoft.com	●	○	●	●	●	microsoft	●	●	●
Netscape	home.netscape.com	●	○	●	●	●	netscape	●	●	●
Symantec	www.symantec.com	○	○	○	●	●	symantec	●	●	●
SYSTEMS										
Acer	www.acer.com	●	●	●	●	●	acer	●	●	○
Compaq	www.compaq.com	○	●	●	●	●	compaq	●	●	●
Dell	www.us.dell.com	●	●	●	●	●	dell	●	●	●
Gateway 2000	www.gw2k.com	●	●	●	●	●	gateway	●	●	●
IBM	www.pc.ibm.com	●	●	●	●	●	ibm	●	●	●
Micron	www.mei.micron.com	●	●	○	●	●	micron	●	●	○
NEC	www.nec.com	○	●	●	●	●	–	–	–	–
Packard Bell	www.packardbell.com	○	●	○	●	●	packard bell	●	●	○
PERIPHERALS										
Creative Labs	www.creaf.com	●	○	●	●	●	blaster	●	●	●
Diamond	www.diamondmm.com	○	●	○	●	●	diamond	●	●	○
Hayes	www.hayes.com	○	●	○	●	●	hayforum	●	●	●
Hewlett-Packard	www.hp.com	●	○	●	●	●	hp	●	●	●
Iomega	www.iomega.com	○	●	●	●	●	pcven	●	●	●
Logitech	www.logitech.com	○	●	○	○	●	logitech	●	●	●
Quantum	www.quantum.com	○	○	○	●	●	–	–	–	–
Seagate	www.seagate.com	○	○	●	●	●	seagate	●	●	●
U.S. Robotics	www.usr.com	○	●	○	●	●	usrobotics	●	●	●

● Yes ○ No WWW Direct link to World Wide Web

of your monitor, you've probably found your culprit. But usually you'll have to take a look at the evidence and make an educated guess. Try to assign the source of the problem to the computer, one of its peripherals, Windows 95 (or DOS/Windows 3.*x*), or a software application.

One good place to look for troubleshooting clues is in your PC's start-up routine. Carefully watch your monitor as the machine boots up. That text scroll that whizzes by often contains error messages. Press **<Pause>** to freeze the scroll and look for messages that identify peripherals not found or not configured properly. These and other error messages offer valuable feedback that can point you in the right direction. Always write down the complete error message, no matter how cryptic, for future reference.

AMERICA ONLINE

Keyword	E-mail	Message board	Knowledge base	Software/ file library	FAQ
corel	○	●	WWW	●	●
intuit	○	●	●	●	●
–	–	–	–	–	–
microsoft [Web link]	○	WWW	WWW	WWW	●
netscape	○	●	○	●	●
symantec	○	●	○	●	●
acer	○	●	WWW	●	WWW
compaq	○	●	WWW	WWW	○
dell	○	●	WWW	WWW	WWW
gateway	○	●	●	○	○
ibm	○	●	WWW	WWW	WWW
–	–	–	–	–	–
nec	○	●	○	●	●
–	–	–	–	–	–
–	–	–	–	–	–
diamond	●	○	○	●	●
hayes	○	●	○	●	○
hp	○	●	●	●	●
iomega	○	●	○	●	○
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
us robotics	○	●	○	●	●

VENDOR WEB PAGES OFFER A WIDE ARRAY OF TECH SUPPORT RESOURCES TO HELP YOU FIND THE ANSWERS TO YOUR PROBLEMS.

Also note any recent changes in your computer. If you've recently added new hardware or software, there's a good chance it has something to do with your problem.

Now take your educated guess to the World Wide Web. You may have to visit several sites before you find the right answer. You can find a listing of many vendors' Web addresses on the removable reference card included with this issue. If your vendor is not on the list, try using a search engine such as AltaVista (http://www.altavista.com) or Yahoo (http://www.yahoo.com) to search for the company or model name. If you think the problem stems from a peripheral or an application, then go to that vendor's site first. If you don't get satisfactory results there, go to Microsoft's or your system vendor's site. Microsoft has an excellent searchable knowledge base and over 200 user forums. Since the Windows 95 operating system is sandwiched between the hardware and the applications, information about all kinds of problems usually pops up at Microsoft's Web site.

WEBBING IT: SO MANY RESOURCES, SO LITTLE TIME

VENDOR-SUPPORTED WEB PAGES offer a wide selection of tech support resources: There are FAQs (pronounced *facts*), which list answers to frequently asked questions; knowledge bases that offer extensive databases of product support solutions; e-mail facilities to send questions directly to company personnel; newsgroups or forums where users and company reps share information; and file libraries with downloadable drivers, utilities, and product read.me files. Keep in mind that different sites offer different resources, and some of these can overlap on occasion—for example, you might find a FAQ stored in a file library.

Once you've located a vendor's home page, look for the link to tech support. Most Web sites are clearly marked, but at some sites the poorly designed pages make it easy to get confused. Fortunately, many sites have built-in search functions to ease navigation. Just type **support** or **service** on the search query line and most of the time you'll beam straight to the support page.

FAQs. The first place to stop on any site is the FAQ, a list of frequently asked questions with answers culled from previous support inquiries. A FAQ can be just a long text file that you have to scroll through; if you're lucky, though, it'll be a list of ▶

questions with each one hyperlinked to its answer. If your problem is common, it will be covered by one of the 10 or 20 questions typically found for each product. Questions range in complexity from "Why does my mouse have two buttons?" to "Will closing jumper E-6 bypass the secondary IDE channel and let me use protected-mode drivers?"

The quality of FAQs varies greatly. The FAQ covering all of Compaq's desktop computers has a scant 8 questions, while Lotus's FAQ for 1-2-3 has more than 40 questions listed by categories ranging from common error messages to clever shortcuts for data entry. The best sites present the questions by category and then order them by how frequently they're requested. But most sites just give you a long text file of alternating questions and answers. To avoid scrolling through heaps of useless data, try using the Find feature on your browser. If you have a problem with your video card, for example, search on the word "video" or on the model's name. If you come up empty-handed, move to the company's knowledge base.

KNOWLEDGE BASES. If your search through the FAQ has turned up nothing, your next stop should be the site's knowledge base. A knowledge base is a searchable database that contains all kinds of product support information ranging from the latest bug lists to background papers on current technologies (and sometimes even FAQs).

At the heart of a knowledge base are short articles that describe tech support problems and, hopefully, their solutions. Problems and solutions are continually updated by the company's technical support people. In fact, some phone support staffs, such as Microsoft's, use the knowledge base as one of their main troubleshooting resources. Right now many major hardware and software vendors are developing online knowledge bases, and several companies already have limited models in place. But only big players like Microsoft and Lotus have fully stocked databases that are really useful.

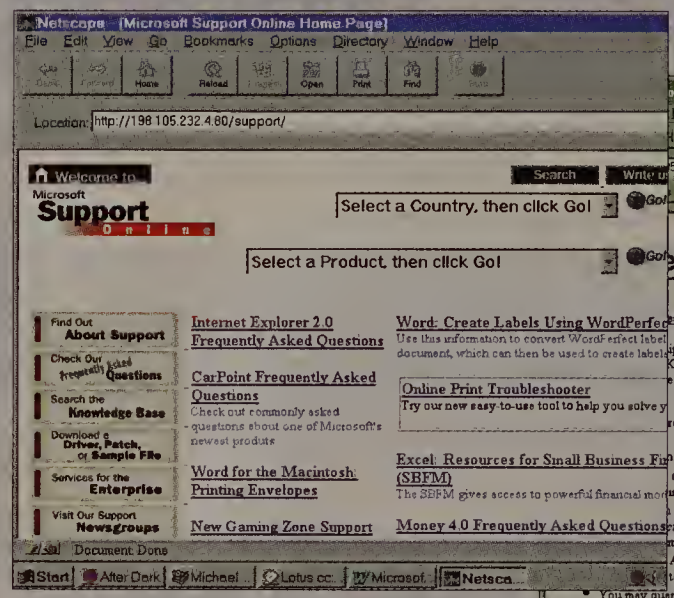
Microsoft boasts a first-rate knowledge base that's packed with problem-solving information for some 40 of the company's products. Responses are usually fast, plentiful, and well written, with brief sections on the problem's symptoms, causes, and solutions. Hewlett-Packard's Web site, on the other hand, has plenty of searchable information such as driver files and FAQs, but it doesn't provide the troubleshooting resources that can be found in the Microsoft and Lotus knowledge bases.

Between these two is Dell's Autotech Diagnostic System. More of a smart FAQ than a knowledge base, this expert system guides you to an answer by asking successive questions about the problem. If your problem falls within the limits of the Autotech decision tree, you can go step by step to your solution. If not, you're given Dell's tech support number and left to fend for yourself.

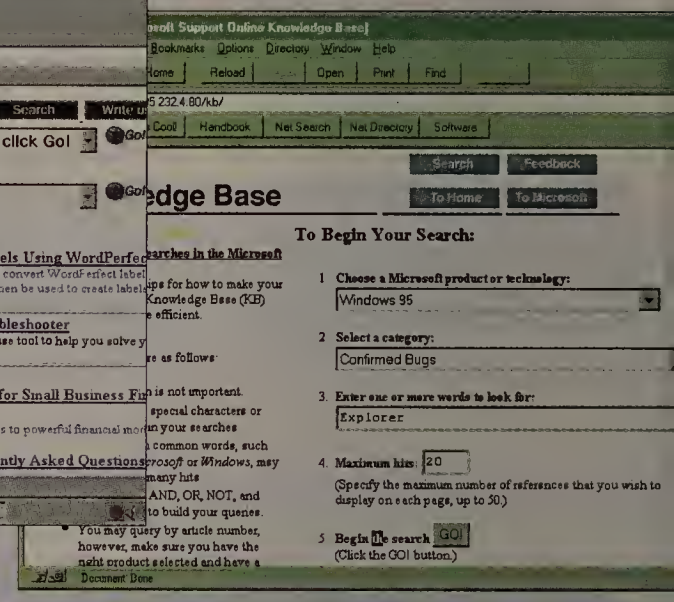
Using a knowledge base is no different than using a keyword to search a database. Investigate the scope of the knowledge base by starting with broad queries and then narrowing the field. For example, search first on "printer" if you think you have a problem printing TrueType fonts on your LaserJet printer. This should

FOUR EASY STEPS to Knowledge

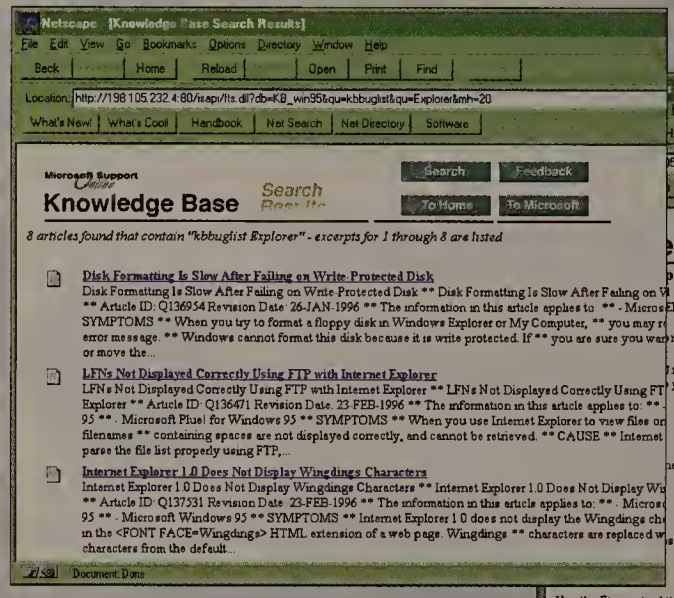
AN ONLINE KNOWLEDGE BASE CAN BE A WONDROUS THING, if you know how to use it. These repositories of tech support wisdom can save you hours of fumbling through FAQs and e-mail. Here's an example of how to use the extensive knowledge base maintained on Microsoft's Web site to find information about Windows 95 bugs.



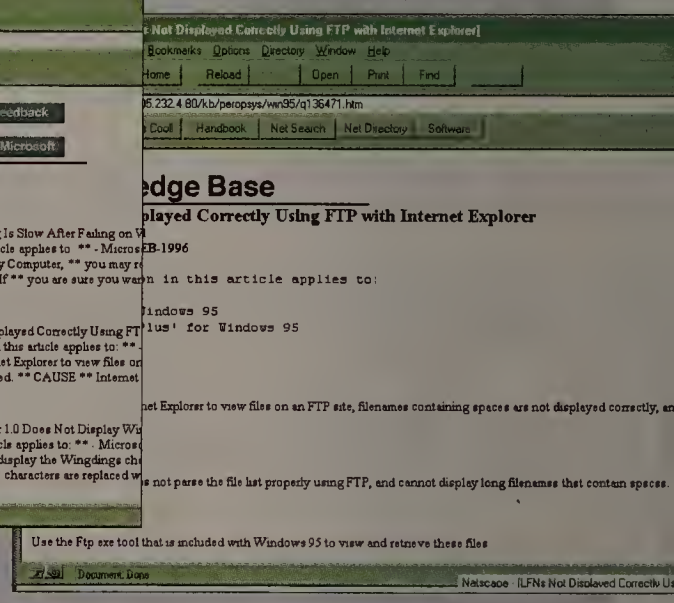
1 CLICK THE LINK to the knowledge base, usually found on the site's main support page.



2 TYPE IN YOUR SEARCH criteria or choose topics from a pop-up list, then click *Go*.



3 YOU'LL GET A LIST OF ARTICLES that meet your criteria, along with a brief summary of each. Click the title of the one you want to view.



4 VOILÀ! YOU'VE REACHED a text file filled with information on symptoms, causes, and possible solutions to your problem.

generate a long list of responses that will give you a sense of the type and amount of information available. Then narrow your search by looking for words that are likely to be included in the answer you're looking for, such as the model of your printer or the program you're having trouble with. You can quickly narrow a search by querying with more than one word, such as "1-2-3 and LaserJet 4."

E-MAIL. Still stumped? Maybe it's time to seek professional help. Some companies will let you send an e-mail directly to tech support. Others, including Microsoft, will charge you for the privilege via its premium subscription support service. Only 13 of the 23 companies we looked at offer e-mail support (see "Online Tech Support"). If your vendor offers it, you can usually find an e-mail link somewhere on the support page. Be sure to state your problem clearly and include all relevant information. (See "Get the Right Advice the First Time.")

If the site offers a fill-in-the-blank template for constructing your e-mail query, use it. A template ensures that technicians get all the information they need. This can significantly increase your chances of getting a quick, accurate response the first time. Most companies that offer e-mail support try to respond within one to two days, but it's not unusual to find longer turnaround times during peak demand—like after a new product launch.

NEWSGROUPS (USER FORUMS). If you can't find a direct e-mail link, you still may be able to get feedback from tech support through vendor-supported newsgroups. These electronic bulletin boards allow users to post questions and get answers from company support personnel, company-approved volunteers, or peers like yourself.

GET the Right Advice the First Time

WE ASKED ONLINE SUPPORT TECHNICIANS to describe the best ways for users to get answers to their questions—quickly. You can use these tips in all technical support communications, be it by e-mail, voice, or fax.

- **REPEAT HISTORY.** Describe the events that led to the problem. If possible, reboot the computer and re-create the situation. Record every error message or unusual event that you see on screen, from boot-up until the problem recurs.
- **SOCK IT TO THEM.** Give as much information as possible in the first e-mail, including software version numbers and hardware model numbers. Use the built-in Windows utility SysEdit, and cut and paste the contents of your autoexec.bat, config.sys, win.ini, and system.ini files.
- **DEVICE AND CONSENT.** Device Manager in Windows 95's My Computer lets you output its contents to a file. You can attach this file to any e-mail you send so the tech support people will know your computer's configuration.
- **EASY DOES IT.** Keep your message simple by using short, direct sentences, and avoid using vague or general words like "it" or "thing."
- **CHILL OUT.** Most of all, keep cool. It's easy to take your frustrations out on a faceless technical analyst. All you're going to do is slow down the process by annoying someone who's trying to help you.

TAKE TIME TO SCAN THE QUESTIONS AND ANSWERS ALREADY IN NEWSGROUPS. YOU'LL SEE HOW THE GROUP WORKS AND YOU MIGHT EVEN FIND WHAT YOU NEED.

This kind of support has been widely available for years in support forums on CompuServe and other services, as well as in thousands of non-vendor-supported newsgroups on another part of the Internet called Usenet (see "Usenet: All the Newsgroups That Fit"). Only recently has it started to show up on the Web. Microsoft just launched more than 200 Web-based newsgroups, each focusing on a different application or technical support topic. Other companies, such as Corel, are watching Microsoft's effort with an eye toward developing similar facilities.

A newsgroup often maintains its own FAQ in order to reduce the number of repeat questions. Your first task is to look for a FAQ. It may be contained inside a perpetually posted message on the newsgroup or in a file located elsewhere on the Web. If the FAQ doesn't help, it's time to go to the messages.

Before rushing in and posting your inquiry, take time to scan the questions and answers already there. Not only will this give you a feel for how the group works, but you might even find what you're looking for before you ask. However, unless you have a fairly common question, odds are you won't find a useful answer in the messages.

Hopefully, each question and its responses will be grouped in a linear thread—just like e-mail—that lets you easily view the entire question-and-answer process. Questions and responses are displayed only for a limited time after their posting date (days, weeks, or months depending on the newsgroup). As a result, you may sometimes see a group of responses without the original question. If this happens, check the responses to see if the initial question is embedded in one of them.

A quick way to hunt for a particular question or response is to use your browser's Find function. Also check the time stamps on questions and their answers to get an idea of how quickly you can expect an answer. Response times vary widely from newsgroup to newsgroup: One to two days is typical, but getting back in just hours—or not at all—isn't unheard of.

FILE LIBRARIES. So you've read the FAQ, searched the knowledge base, and scanned the newsgroups. You figured out that all you need is a new device driver, a patch, and some other small bit of software. Piece of cake: Most Web sites have links ▶

WHAT PRICE, GLORIA?

Phone Support Versus Online Help

ONLINE SUPPORT IS GREAT if you have the time, but you'll always get the best and quickest answers from a live technician. Right? Not necessarily. In fact, for the same kind of questions, online help could be a better solution—and it's a lot cheaper.

To compare online help versus phone support, I invented two typical questions: One was a how-to, and the other sought a solution to an apparent bug. I went trolling for answers using Microsoft's online and pay-per-call phone support.

EXCELLING AT EXCEL

My first question: How do I import DOS-based Quattro Pro workbook files into Excel 5.0? To find out, I called Microsoft's FastTips Line at 10 p.m. on a Sunday. I waited a few seconds while my technician, Gloria, did some typing, rustled papers, and sipped her coffee. Then she gave me the scoop: Excel couldn't directly import the file. She then detailed a couple of clever work-arounds. In less than 5 minutes I had my answer. **Time passed: 5 minutes. Cost: $35.**

Then I went online. My first stop was Microsoft's knowledge base on its Web home page. I selected Excel from the pull-down menu and searched on the word "Quattro." The search returned 22 articles on Excel/Quattro Pro issues, but none dealt with my problem. I returned to the main support page and entered a newsgroup for Excel. Before composing my plea for help, I quickly scanned the posted messages.

Bingo! I was not alone. The message list contained the same question I was about to ask and, even better, a response from an MVP—a Microsoft-approved volunteer who monitors a newsgroup. Included in the response was one of the solutions I got from Gloria. **Time passed: 10 minutes. Cost: $0.**

YOUR CALL IS IMPORTANT TO US. If that's the case, why do I have to wait so long before you'll take it? asks author Kirk Steers.

to file libraries—or FTP sites—filled with drivers, upgrades, utility programs, and documentation.

Downloading a file is simply a matter of finding the file name and clicking on it. At some of the more polished sites like Gateway 2000's and Compaq's you'll find well-organized lists with short descriptions of each file.

But other Web sites, such as Creative Labs', display a primitive directory tree based on the FTP site's file structure. Here files and subdirectories are listed by name only, or with just a few descriptive words.

If you have to look for a file in one of these FTP directories, usually the best place to start is in a pub (for public) directory. You can examine the contents of an FTP directory by clicking on its name. This displays a list of all the files and subdirectories, just like a crude version of Windows File Manager. The best way to avoid confusion is to find the exact name of the file you want from the knowledge base, e-mail, or other source. Then go to the file library. Once you find what you need, click on the file name to begin downloading.

Since many library files are actually multiple files stored in a single compressed one, you might also want to create a new directory—or folder in Windows 95—where you can conveniently uncompress them. ▶

DIALING UP WITH WINDOWS 95

My second question concerned a problem I've had trying to log on to the Internet using Window's 95 Dial-up Networking feature. The check box that tells Windows to save my Internet password was always grayed out, so I had to retype my password each time I logged on. A small inconvenience—unless you log on 20 times a day, which I often do. But I didn't think this was worth another $35 phone call. So this time I went to the Web first. I selected Windows 95 from the Microsoft knowledge base's product list and searched on the words "dial" and "password."

Cowabunga! Of the 37 articles posted there, the first one was titled "Save Password Check Box Is Unavailable." The article described my problem and offered two solutions. Because the second solution required installing network software, I tried the first, which involved manipulating a Windows password file. After a brief struggle with various menus and configuration boxes , I realized I needed to know more .

I turned back to the newsgroups and posted a message on the appropriate Windows 95 board. An MVP replied within 2 hours, and I was able to solve the entire password problem in 30 minutes. **Time passed: 2.5 hours. Cost: $0.**

After my online success, I figured a phone-support pro would find the same information instantly. Wrong. First came a methodical exploration of setup screens and communications parameters, and then the technician, Lloyd, suggested several possible solutions. One would have required that I type my Windows password for log-on. Another would have rearranged all the icons on my desktop. After 10 more minutes, Lloyd led me to the same solution I'd found online. **Time passed: 30 minutes. Cost: $35.**

While Lloyd was patient and committed to looking for a better solution, I keep wondering if I would have settled for the first, less satisfactory answer had I not gone online first to discover all my options.

Probably. Wouldn't you?

PHOTO: GERRY GROPP

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Circle 235 on reader service card

ONLINE Alternatives to the Web

BEFORE INTERNET MANIA STRUCK AMERICA, the only place to get online support was on CompuServe and, to a lesser extent, America Online. There you could find company-sponsored forums with access to trained technical support personnel and extensive file libraries.

Though many companies—most notably, Microsoft—are moving their support services to the Web, the online services still offer a vast array of support services. Here's how to get the most out of them.

COMPUSERVE

CompuServe has forums for hundreds of hardware and software companies, maintained by their own technicians and/or competent third-party support firms. There are also scores of generic subject-based computing forums (CD-ROM, Multimedia, Windows) populated with knowledgeable users.

HOW TO FIND IT. To locate the forum you want, click on Find in the Services menu or on the toolbar and type in the name of the company, product, or technology you want to investigate. Find will return all forums linked to the keyword.

HOW TO USE IT. When you arrive at a forum for the first time, you'll see a dialog box that asks whether you want to join the forum. You do. (If you choose the visit option, you may not be able to access all parts of the forum.)

Make your first stop at the library by clicking the bookshelf icon. Here you'll find FAQs, utility programs, software updates, device drivers, and other files that may help solve your problem. To search for a specific file, or to find files on a particular subject, click the magnifying glass icon. If you want to browse through all the files in the library, click on the hand icon.

If the library doesn't have what you need, it's time to visit the message board. Here you can post queries to trained support technicians (in vendor-supported forums) and experienced users.

Click on the hand-and-pencil button and fill in the form. If you're not sure where to send the message, note the addressees for the posted responses to other messages. Some analysts specialize in certain topics and give quicker replies. If you're still not sure whom to address a message to, send it to the sysop (system operator) of the forum that interests you; the sysop will either answer it or redirect it for you.

AMERICA ONLINE

Like CompuServe, AOL offers technical support in vendor-supported and general-interest forums.

HOW TO FIND IT. Use a keyword command. Press **<Ctrl>-K**, type in a keyword, and click the *Search* button. Try to be as specific as possible. Typing a vague search word will produce too many results; for example, "software" will return more than 300 possibilities.

Two of AOL's most useful general-interest forums are PC Hardware (keyword: PC hardware) and Software Center (keyword: software center), which offer additional information tools such as the PC Hardware Resources Center.

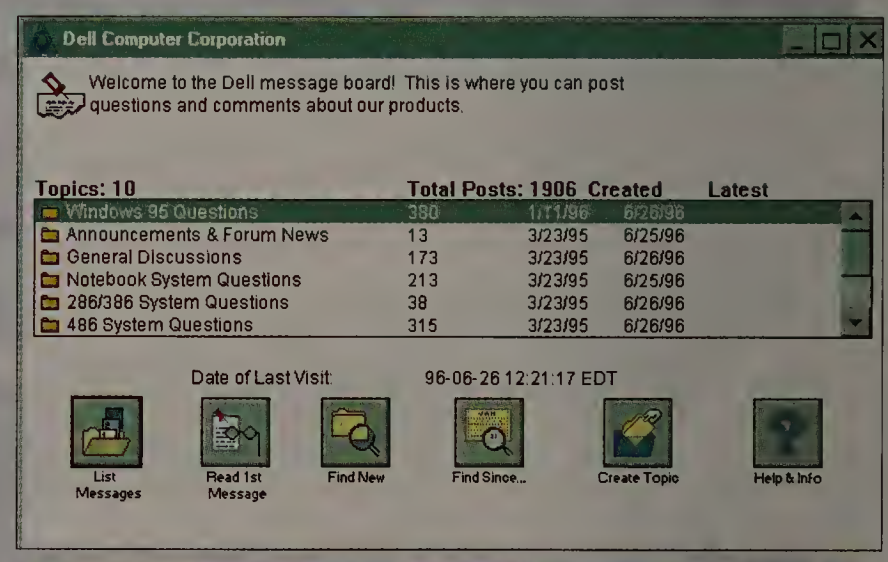
HOW TO USE IT. Not all AOL forums look the same, but most have clearly labeled file libraries and message boards. To download files, click the *Software Library* button and select a subject folder from the screen. If the List More Files button on the right side of the screen isn't grayed out, click it to view more files. Once you've selected a file, you can download it immediately or at a later time by clicking the appropriate button; you can also click a button for a brief description of the file. The convenient Download Later button lets you download a group of files at once and logs off when completed.

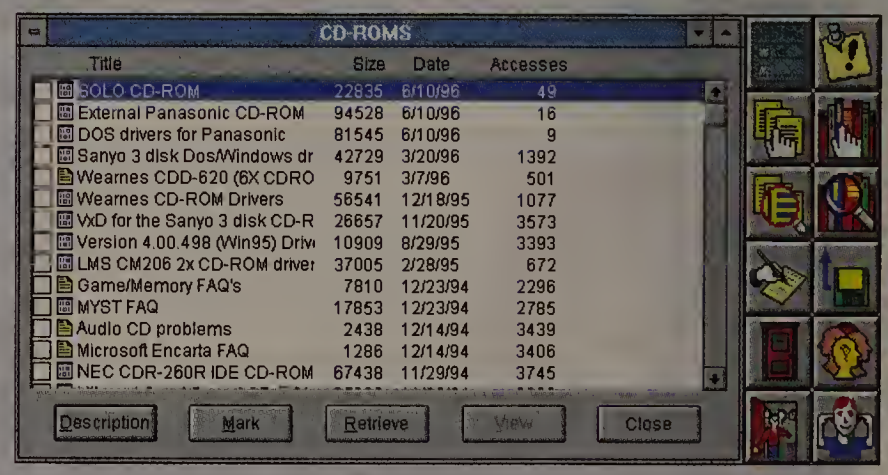
To access the message boards, click *Message Board* in the forum and then *Browse Folders* in the resulting dialog box.

USENET: ALL THE NEWSGROUPS THAT FIT

IF CRUISING VENDOR WEB SITES has left you empty-handed, it's time to look into some other venues. The Internet is loaded with helpful resources such as Usenet newsgroups. The trick is to pinpoint the useful information and still get to bed before sunrise.

If Usenet newsgroups seem similar to vendor-supported newsgroups or user forums, that's because user forums are modeled after Usenet's winning formula: Usenet newsgroups cover hundreds of computer-related topics and offer a vast array of technical information and experience. Since most of them aren't directly supported by a single person or company, the character of these different newsgroups varies widely. Posting a question to a busy group like comp.sys.ibm.pc.hardware can get you a response in hours. The same question posted to the rarely





GIVE AND TAKE ONLINE: You can find the answers to your problems on messages boards such as Dell Computer's (top) by clicking on the subject area you are investigating. You can also post questions for the company and other users to answer. File libraries, such as the one for the CompuServe CD-ROM forum pictured here (bottom), let you select one or many programs or text files to download.

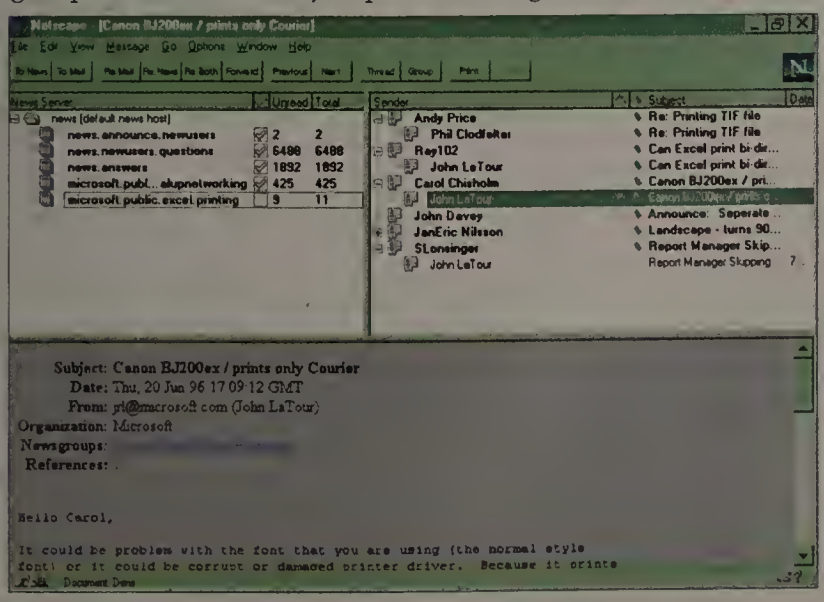
visited comp.sys.ibm.pc newsgroup may never be read.

Usenet newsgroups can be accessed directly by using an Internet software utility known as a newsreader, or indirectly via the Web. The Zippo News Service (http://www.zippo.com), for example, lets you view many Usenet newsgroups in Web-page format. But for easiest viewing, you need to use a newsreader to connect directly to a Usenet server. You can download a free version of Forte's Free Agent, an excellent newsreader, from the company's Web site (http://www.forteinc.com). Many Internet service providers include Usenet access as part of their standard package. Also, both Netscape Navigator and Microsoft Internet Explorer have newsreaders built in.

There are thousands of newsgroups available, many with names like alt.cow.moo.moo.moo. Your job is to find the one that has the answer to your problem. Your best bets for technical help are the newsgroups that start with the prefix alt (for alternative) or comp (computer). For example, alt.sys.pc-clone.gateway2000 is the address of a newsgroup that deals exclusively with Gateway 2000 computer systems, while comp.sys.ibm.pc.sound card.tech focuses on problems with IBM sound cards. Many other newsgroups favor technical professionals, but you'll also find groups that concentrate on general topics, such as comp.multimedia. (See "Newsgroups: 25 Places to Start Looking," on the attached reference card.)

If you want to avoid scanning the long lists of newsgroups to find something specific, go to a search engine on the Web. AltaVista, best known for its Web searching capability, also searches the titles and body text of current Usenet postings. And Deja News (http://www.dejanews.com) searches both current and archived Usenet messages.

When posting a message to Usenet, follow the same guidelines as for vendor forums and remember a couple of procedures that are specific to Usenet. First, always read the FAQ for the newsgroup. Posting questions that are already answered in the FAQ—especially in highly focused technical groups—may elicit a barrage of less-than-polite responses telling you to look there first (this is called flaming). Second, it's always a good idea to "lurk" in a newsgroup, reading the postings and getting a feel for how the group functions before you post a message.



MOST WEB BROWSERS now have built-in newsreaders, so you can easily access newsgroups. Once you're in a group, you'll see the subcategories, number of postings, and message topics to select.

HELP YOURSELF!

ONLINE HELP IS BECOMING AN INTEGRAL PART of both software and print media. Many troubleshooting utilities include links to online support databases. Check out these programs and books.

- **Oil Change (Cybermedia, $39.95 per year, 800/721-7824, Reader service no. 771)** logs the software installed on your PC and provides revisions and updates at your request. When you connect to its database on the Web, Oil Change notifies you of available updates and installs them to your system as you wish. This utility also backs up old drivers when it updates them, so you can undo any unwanted changes.
- **e.support (TouchStone Software Corp., $29, 800/531-0450, Reader service no. 772)** is a wizard-based troubleshooting utility. It first queries users about the hardware or software problem, then combines this information with a system profile. A detailed report is then sent via e-mail to the tech support department of the manufacturer of the product diagnosed as causing the problem.
- **SOS Help Center (Torch U.S.A. Inc., 800/300-2199, http://ww.torch-usa.com)** is a research service that can answer questions on any PC-based technical issue, from troubleshooting hardware and software problems to locating replacement parts for hardware. Subscription price is $4.95 per user per month with unlimited access to the replacement parts database. The cost per question varies on the amount of research Torch U.S.A. must do.
- **The Computer Phonebook (No Starch Press, 1996, 800/420-7240, $12.95)** is a comprehensive directory that lists mailing addresses, phone and fax numbers, and (when available) the direct BBS and online addresses for more than 14,000 computer hardware and software companies, national user groups, trade/dealer groups, and third-party support firms.
- **Tech Support Yellow Pages (Cybermedia, 1996, 800/721-7824, $19.95)** includes the technical support numbers and online addresses of some 2000 hardware and software companies. Its included CD-ROM has built-in hyperlinks that let you conveniently connect directly to company Web sites. —*Michael S. Lasky*

GET A DISCOUNT. If you've tried everything else and really need personalized tech support, perhaps discount is the way to go. If $30 is too much to pay for a simple software problem, what about $15? Third-party support companies are moving to the Web to fill the niche between high-priced and free help. Softmart's Web site (http://www.softmart.com) offers an e-mail response within 24 hours. Help with one of 16 major software programs, such as Windows 95 or various office suites, costs $15—about half the going rate for phone support. Other third-party companies will be sure to follow in the months ahead.

When used in the right situation, however, online resources can be useful and effective tools. And with many companies placing the bulk of their technical support online, you may find yourself there more often than you expect. ▶

Kirk Steers is a contributing editor, and Michael S. Lasky is senior associate editor, for PC World. *Turn the page to find the pullout guide to free help online.*

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Adaptec | http://www.adaptec.com | CIS adaptec | E-m support@adaptec.com
ADI Systems, Inc. | http://www.adi-online.com
Adobe Systems, Inc. | http://www.adobe.com | CIS dptvend
Advanced Gravis Technology | http://www.gravis.com | E-m tech@gravis.com
ALPS Electric | http://www.alps.com
AMD | http://www.amd.com | E-m hwsupt@brahms.amd.com
America Online | http://www.aol.com | AOL member services
American Megatrends | http://www.megatrends.com | E-m support@american.megatrends.com
American Power Conversion | http://www.apcc.com | E-m apctech@apcc.com
AMS | http://www.amsnote.com
Apple Computer | http://www.apple.com
AST Research | http://www.ast.com/americas/ast.htm | AOL ast | E-m web.support@ast.com
ATI Technologies | http://www.atitech.ca | E-m 74740.667@compuserve.com
Austin Computer Systems | http://www.austindirect.com
Autodesk | http://www.autodesk.com | AOL autodesk | CIS adesk
Banyan Systems | http://www.banyan.com | CIS ban forum
Berkeley Systems Design | http://www.berksys.com/index.html | E-m tech@berksys.com
Bitstream | http://www.bitstream.com
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Borland Int'l | http://www.borland.com | CIS borland | E-m customer-support@borland.com
Broderbund Software | http://www.broderbund.com | CIS bb | E-m support@broderbund.com
Brother Int'l | http://www.brother.com
Caere | http://www.caere.com
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Citizen America | http://www.citizen-america.com
Claris | http://www.claris.com | CIS claris
Compaq | http://www.compaq.com | E-m support@compaq.com
CompuServe | http://www.compuserve.com
Computer Associates | http://www.cai.com | CIS cai
Conner Peripherals | http://www.seagate.com

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Cyrix | http://www.cyrix.com | E-m tech_support@cyrix.com
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Dataviz | http://www.dataviz.com
Dell | http://www.us.dell.com | AOL dell | CIS dell | E-m support@us.dell.com
Delrina (Symantec) | http://www.delrina.com | AOL symantec | CIS symantec | E-m support@delrina.com
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Lasermaster	http://www.lasermaster.com			
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Logitech	http://www.logitech.com		CIS logitech	E-m tech_support@logitech.com
Lotus	http://www.support.lotus.com		CIS lotuswp	
Macromedia	http://www.macromedia.com	AOL macromedia	CIS macromedia	
Maxis	http://www.maxis.com		CIS gampub	E-m support@maxis.com
Maxtor	http://www.maxtor.com			E-m technicalassistance@maxtor.com
McAfee Assoc.	http://www.mcafee.com	AOL mcafee	CIS mcafee	E-m support@mcafee.com
MECC	http://www.mecc.com			E-m support@softkey.com
Megahertz	http://www.megahertz.com	AOL megahertz	CIS megahertz	E-m techsupport@mhz.com
Meridian Data	http://www.meridian-data.com			
Microcom	http://www.microcom.com			
Micrografx	http://www.micrografx.com			
MicroHelp	http://www.microhelp.com			E-m tech@microhelp.com
Micropolis	http://www.micropolis.com			E-m support@techsupport.micropolis.com
Microsoft	http://www.microsoft.com			
Microtek	http://www.mteklab.com	AOL mgr	CIS graphsup	E-m support@mteklab.com
Midwest Micro	http://www.mwmicro.com			
Mitsubishi Electronics, America	http://www.mela-itg.com			E-m tsupport@msm.mea.com
Motorola	http://www.motorola.com			
Multi-Tech Systems	http://www.multitech.com			E-m tsupport@multitech.com
Nanao USA	http://www.traveller.com/nanao/			
NEC Technologies	http://www.nec.com/			E-m tech-support@nectech.com
Netcom	http://www.net.com			
Netis Technology	http://www.netistech.com/index/html			E-m support@netis.com
Netscape Communications	http://www.home.netscape.com	AOL netscape		
Nico Mak Computing	http://www.winzip.com/winzip/			
Nokia Display Products	http://www.nokia.com			
Novell	http://www.novell.com			
Okidata	http://www.okidata.com/			
Orchid Technology	http://www.orchid.com		CIS orchid	
Packard Bell	http://www.packardbell.com/index.html		CIS packard bell	E-m support@packardbell.com
Panasonic	http://www.panasonic.com			
Peachtree Software	http://www.peach.com	AOL peachtree	CIS peachtree	E-m paw_support@peach.com
Performance Technology	http://www.perftech.com			E-m support@perftech.com
Pinnacle Micro	http://www.pinnaclemicro.com			
PKWare	http://www.pkware.com	AOL pkware	CIS pkware	
Polywell Computers	http://www.polywell.com			E-m polyeng@hooked.net
Practical Peripherals	http://www.practinet.com	AOL ppi	CIS ppiforum	E-m support@practinet.com
Prodigy	http://www.prodigy.com			
QMS	http://www.qms.com		CIS qmsprint	
Qualitas	http://www.qualitas.com	AOL qualitas	CIS pcvena	E-m tech@qualitas.com
Quantum	http://www.quantum.com/quantum.html			
Quarterdeck	http://www.quarterdeck.com		CIS quarterdeck	
S&S Int'l	http://www.drsolomon.com		CIS drsolomon	E-m support@us.drsolomon.com
Seagate Technology	http://www.seagate.com		CIS seagate	
Shiva Corp.	http://www.shiva.com			
Sierra On-Line	http://www.sierra.com	AOL sierra	CIS sierra	
Sigma Designs	http://www.realmagic.com		CIS sigma	E-m tech_support@sigmadesigns.com
Simple Technology	http://www.simpletech.com			E-m support@simpletech.com
Softkey Int'l	http://www.softkey.com			E-m support@softkey.com
Sony Electronics	http://www.sel.sony.com			
Stac Electronics	http://www.stac.com			E-m software.support@stac.com

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Swan Technologies	http://www.swantech.com			
Symantec	http://www.symantec.com	AOL symantec	CIS symantec	
Syquest Technology	http://www.syquest.com			E-m support-pc@syquest.com
Tadpole Technology	http://www.tadpole.com			E-m support@tadpole.com
Tandy	http://www.tandy.com			E-m support@tandy.com
Tektronix	http://www.tek.com			
Texas Instruments	http://www.ti.com			
Toshiba America	http://www.toshiba.com		CIS toshiba	
Turtle Beach	http://www.tbeach.com		CIS turtle	E-m support@tbeach.com
U.S. Robotics	http://www.usr.com			E-m support@usr.com
Ulead	http://www.ulead.com	AOL ul support	CIS ulead	
Umax Technologies	http://www.umax.com		CIS umax	E-m support@umax.com
VideoLogic	http://www.videologic.com		CIS videologic	E-m support@videologic.com
ViewSonic	http://www.viewsonic.com			E-m vstech@viewsonic.com
Visio Corp.	http://www.visio.com		CIS visio	
Visioneer	http://www.visioneer.com	AOL visioneer	CIS visioneer	E-m tech-support@visioneer.com
VocalTec	http://www.vocaltec.com			E-m support@vocaltec.com
Western Digital	http://www.wdc.com	AOL wdc		
Zoom Telephonics	http://www.zoomtel.com	AOL zoomtell	CIS zoom	

NEWSGROUPS: 25 Places to Start Looking

With over 10,000 Usenet newsgroups out there, finding the right one can be difficult. We've assembled a list of 25 newsgroups that are active, friendly, and full of useful tech support information.

Note: Group names that end with asterisks indicate several useful groups that start with this prefix. IBM in the name refers to IBM-compatible PCs, not necessarily the company.

Newsgroup	Subject area
alt.comp.hardware.homebuilt	General hardware
alt.comp.hardware.pc-homebuilt	General PC hardware
alt.comp.periphs.mainboard.asus	ASUS brand motherboards
alt.corel.graphics	Corel graphics programs
alt.os.windows95.crash.crash.crash	Problems with Windows 95
alt.periphs.pcmcia	PC Card peripherals
alt.sys.pc-clone.acer	Acer computers
alt.sys.pc-clone.dell	Dell computers
alt.sys.pc-clone.gateway2000	Gateway 2000 computers
alt.sys.pc-clone.micron	Micron computers
alt.sys.pc-clone.zeos	Zeos computers
alt.winsock.*	Windows TCP/IP socket programs
comp.graphics.*	Graphics software programs
comp.multimedia	Multimedia hardware and software
comp.os.ms-windows.*	Windows 3.*x* and 95 hardware and software
comp.publish.cdrom.*	CD-ROM hardware, software, publishing
comp.sys.ibm.pc.games.*	Gaming software and hardware
comp.sys.ibm.pc.hardware.cd-rom	CD-ROM drives
comp.sys.ibm.pc.hardware.comm	Modems, serial ports, communications software
comp.sys.ibm.pc.hardware.misc	All hardware
comp.sys.ibm.pc.hardware.storage	Hard disks, tape drives
comp.sys.ibm.pc.hardware.systems	Motherboards, computer systems
comp.sys.ibm.pc.hardware.video	Video cards, drivers, MPEG
comp.sys.ibm.pc.misc	General hardware and software issues
comp.sys.ibm.pc.soundcard.*	Sound cards

Dear former
computer company,

here is a list of my demands:

1. i want to buy
high performance
direct and
i want it fast!

2. i want a company that has
important
friends who
back them up.

3. when i call, i want to
talk to a human being
who knows my name.

Nothing personal,
it's just the way
to do business now.

multi-media

option #1
- 133MHz Pentium® Processor
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- 8X CD-ROM
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- Real-time video capture & MPEG1 playback
- 33.6 kbps FAX modem with Simultaneous Voice over Data
- 16-bit SRS® 3D wavetable audio
- Altec-Lansing® powered speakers
- 15" (13.7" viewable) display
- Microsoft® Windows® 95
- Corel® WordPerfect® Suite 7 and Z-MPC bundle*

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- 166MHz Pentium® Processor
- 256K pipeline burst cache
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- 2.1GB EIDE Hard Drive
- 8X CD-ROM
- 64-bit 3D video with 2MB EDO
- Real-time video capture & MPEG1 playback
- 33.6 kbps FAX modem with Simultaneous Voice over Data
- 16-bit SRS® 3D wavetable audio
- Altec-Lansing® powered speakers
- 15" (13.7" viewable) display
- Microsoft® Windows® 95
- Corel® WordPerfect® Suite 7 and Z-MPC bundle*

lease for $82/mo **$2249**

option #3
- 200MHz Pentium® Processor
- 256K pipeline burst cache
- 32MB EDO DRAM
- 2.1GB EIDE Hard Drive
- 8X CD-ROM
- Iomega® Zip 100 drive
- 64-bit 3D video with 2MB EDO
- Real-time video capture & MPEG1 playback
- 33.6 kbps FAX modem with Simultaneous Voice over Data
- 16-bit SRS® 3D wavetable audio
- Cambridge SoundWorks® speakers
- 17" (15.5" viewable) display
- Microsoft® Windows® 95
- Corel® WordPerfect® Suite 7 and Z-MPC bundle*

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corporate

option #1
- 166MHz Pentium® Processor
- 256K pipeline burst cache
- Intel 430HX PCIset
- Intel PIIX3 PCI - IDE Xcellerator®
- 16MB EDO DRAM
- 1.6GB EIDE Hard Drive
- 8X CD-ROM
- 64-bit video with 2MB SGDRAM
- 15" (13.7" viewable) display
- Plug-N-Play flash BIOS
- Remotely manageable through DMI
- Microsoft® Windows® 95
- Microsoft® Office Professional
- Three Year Limited Warranty

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option #2
- 200MHz Pentium® Processor
- 512K pipeline burst cache
- Intel 430HX PCIset
- Intel PIIX3 PCI - IDE Xcellerator®
- 32MB EDO DRAM
- 2.5GB EIDE Hard Drive
- 8X CD-ROM
- 64-bit video with 2MB SGDRAM
- 17" (15.5" viewable) display
- Plug-N-Play flash BIOS
- Remotely manageable through DMI
- Microsoft® Windows® 95
- Microsoft® Office Professional
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portables

z-star mx
- 100MHz Pentium® Processor
- 256K pipeline burst cache
- 10.4" Active Matrix 800x600 screen
- 8MB DRAM, expandable to 40MB
- 810MB EIDE Hard Drive
- NiMH battery
- 16-bit sound w/integrated speakers
- Infrared IrDA port
- 2 Type II PC Card slots
- Trackpad
- 5.9 lbs.

lease for $[illegible]/mo **$259[illegible]**

z-star gx
- 133MHz Pentium® Processor
- Intel 430 MX Mobile PCIset
- 256K pipeline burst cache
- 12.1" Active Matrix 800x600 screen
- 128-bit graphics accelerator w/1MB
- 16MB DRAM, expandable to 40MB
- 1.3GB EIDE Removable Hard Drive
- 6X CD-ROM module
- Lithium Ion Smart battery
- 16-bit sound w/integrated speakers
- Infrared IrDA port
- 2 Type II PC Card slots
- 6.9 lbs.

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z-note 6000
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- Intel 430MX Mobile PCIset
- 256K pipeline burst cache
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- 800x600x16bpp resolution
- 70Hz refresh
- 64-bit graphics accelerator w/2MB
- 16MB DRAM, expandable to 40MB
- 1.3GB EIDE Removable Hard Drive
- 6X CD-ROM module
- Lithium Ion Smart battery
- 16-bit sound w/integrated speakers
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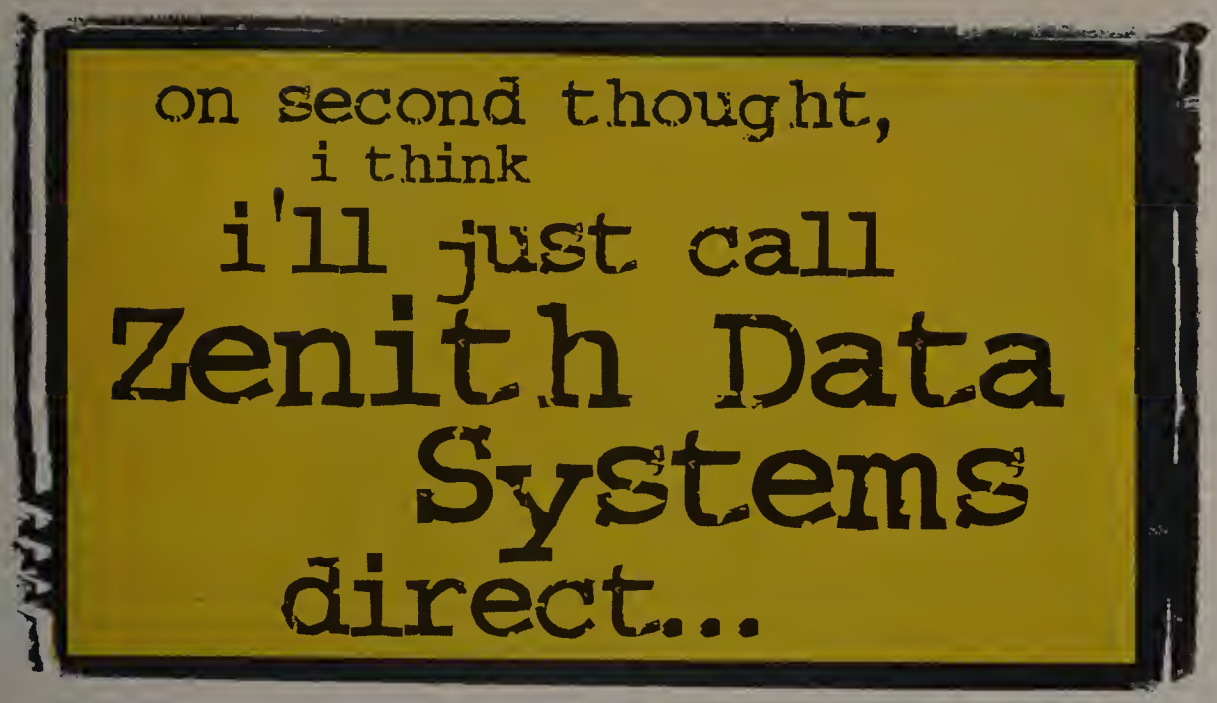

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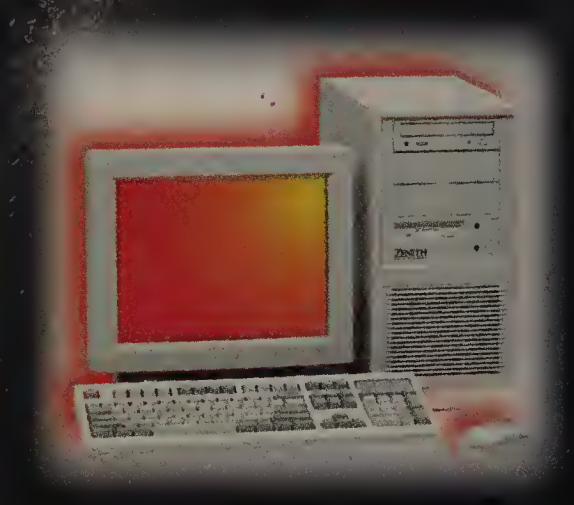

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- 180 MHz Pentium Pro® Processor
- 256K pipeline burst cache
- Intel 440FX PCIset
- Intel PIIX3 PCI to IDE Xcellerator®
- 16MB EDO DRAM
- 2.5GB EIDE Hard Drive
- 8X EIDE CD-ROM
- 128-bit video with 2MB MDRAM
- 17" (15.5" viewable) Display
- Plug-N-Play flash BIOS
- Remotely manageable through DMI
- Microsoft® Windows® 95 or Microsoft Windows NT® Workstation
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- 200 MHz Pentium Pro® Processor
- 256K pipeline burst cache
- Intel 440FX PCIset
- Intel PIIX3 PCI to IDE Xcellerator®
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- 3.1GB EIDE Hard Drive
- 8X EIDE CD-ROM
- 128-bit video with 2MB MDRAM
- 17" (15.5" viewable) Display
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Internet Overload: Disaster in the Making?

Massive logjams and service brownouts are plaguing the Internet. Some say it's headed straight for a breakdown. Are the doomsayers right?

BY JAMES A. MARTIN

ILLUSTRATION: JOHN KLEBER

YOU'VE PROBABLY experienced it. Web pages that take forever to load, endless 'server is busy' messages, even the cryptic 'link dead' response. You may have even found yourself unable to log on to the Net for hours at a time.

Well, you're not alone. For the past year, analysts and scholars have warned that the Internet's delirious joyride is about to come to a screeching, sobering halt. The reason? The Net is being bogged down by more traffic than it can handle.

"I predict the Internet...will soon go spectacularly supernova and in 1996 catastrophically collapse," wrote Bob Metcalfe, founder of 3Com Corporation and inventor of Ethernet, in the first of his many *InfoWorld* columns on the Internet's imminent implosion. Metcalfe is not alone in his pessimism; analysts for The Gartner Group, a Stamford, Connecticut, research firm, foresee a "communications infrastructure blowup and collapse" on the Internet in the near future. And a group of university scientists recently complained to the Federal Networking Council that traffic on the Net had often rendered it "completely catatonic." ▶

Is the Internet headed for a meltdown? To find out, we talked to 30 Internet experts, analysts, and longtime users. Most of them said that reports of the Net's demise are greatly exaggerated. But they also warn that Internet access will soon become even slower—and more expensive—for the vast majority of users.

THE NET IS FALLING! THE NET IS FALLING!

IT'S NO SECRET that the Internet has undergone a virtual explosion thanks to the enormous popularity of the World Wide Web. Two years ago there were about 1000 Web sites, according to Matthew Gray, a researcher at the Massachusetts Institute of Technology who's been tracking the growth of the Web since 1993. These days, Gray says, nearly 1000 new online sites are going up *every day*.

Some 25 million to 35 million people worldwide are on the Internet; that number will reach 100 million by 1998. With the popularity of audio and video content, the volume of data passing through the Net is increasing exponentially.

MCI has seen the traffic on its backbone increase by a staggering 3000 percent from winter 1995 to spring 1996, according to Rob Hagens, MCI's director of Internet architecture in Reston, Virginia. Hagens said the equivalent of 9 million encyclopedias—or 218 terabytes of data—is now being transmitted across the telecommunications giant's Internet backbone every month.

Yet despite the Net's incredible growth, the overwhelming consensus of the Internet experts we interviewed is that a full-scale meltdown is not very likely.

"I predict the Internet will soon go spectacularly supernova and in 1996 catastrophically collapse."

BOB METCALFE, *InfoWorld*

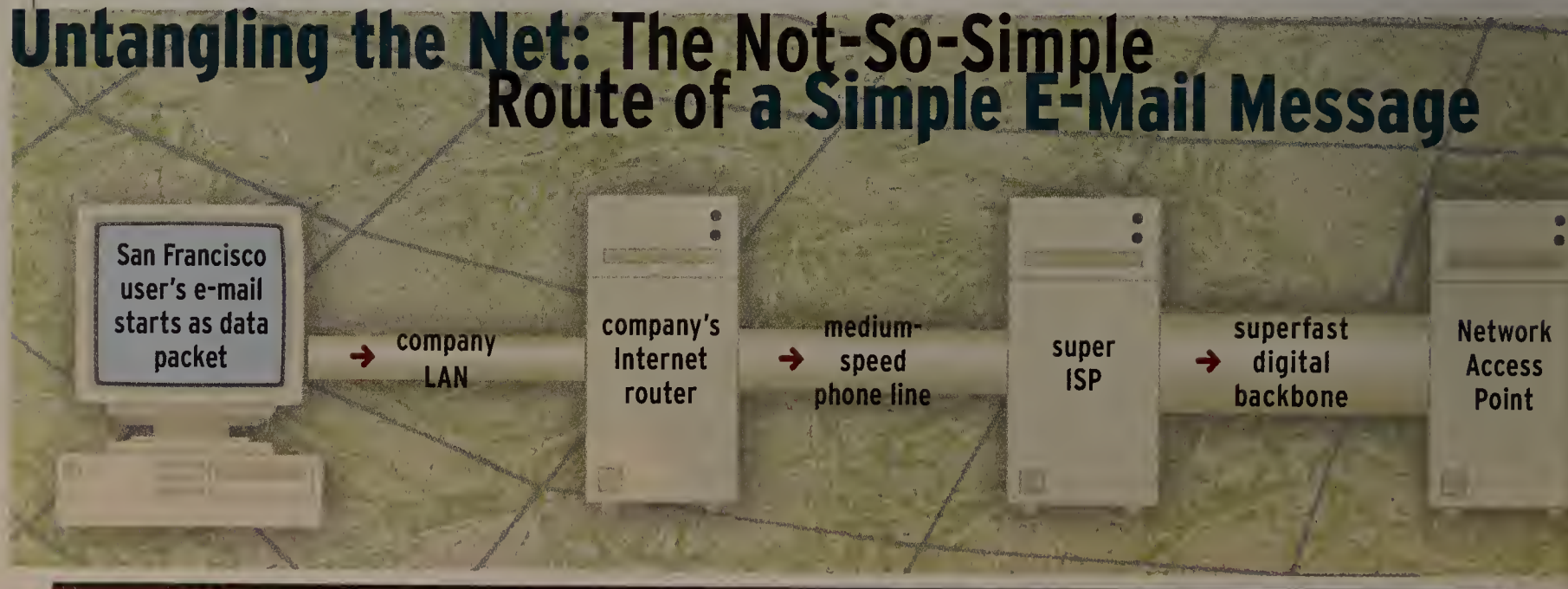
"Let's not forget that the Internet was originally designed to withstand a nuclear assault," says Ted Julian, research manager of Internet commerce for International Data Corporation in Framingham, Massachusetts, referring to the Net's origins as a network for the Department of Defense. "You could cut off both legs and an arm and it would keep moving."

The main reason for the Internet's ultimate survival may be more simple: money. Corporations that have an enormous financial stake in the health of the Net—commercial Internet service providers such as MCI and Sprint, for example—are investing hundreds of millions of dollars in the Net's infrastructure, expanding its ability to handle data.

Until these higher-capacity systems are in place, however, traffic jams and brownouts—small-scale interruptions of Internet service—are going to be more and more common.

"Internet providers are running a horse race these days, trying to upgrade their network backbones before the demand curve rises again," says Vint Cerf, senior vice president for data architecture at MCI and a key figure in the design of the Internet. Despite these efforts, Cerf says Internet users can expect to experience congestion until at least the year 2000.

Untangling the Net: The Not-So-Simple Route of a Simple E-Mail Message



working policies for some 600 colleges and universities, "we're in for a lot of bad hair days on the Internet."

SMALL FRY GET FRIED

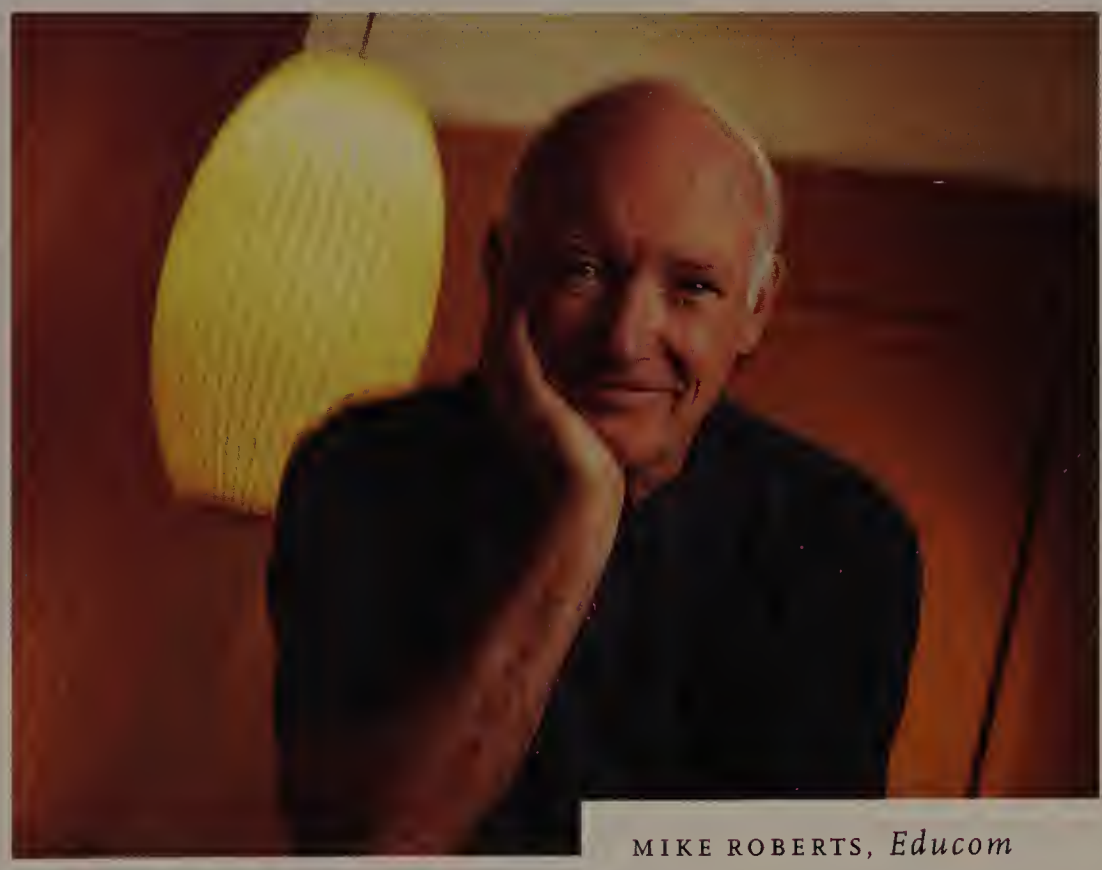
EVEN WORSE, the Internet's growing pains are more likely to be felt by individuals and small businesses who can't afford direct high-speed connections

"I have to build my work schedule around Internet bottlenecks these days," says Rick Harris, a CompuServe sysop, longtime Internet user, and entrepreneur in Atlanta. "I'll frequently postpone getting onto the Internet until after midnight, because it's so much faster at that time than during the day."

But the Net is global, and peak periods vary. "In Sweden they talk about the 'U.S. effect'," says Jonathan Nelson, CEO of Organic Online Inc., a San Francisco consulting firm. "I was there recently, and I could literally feel the Internet slow down around the time New Yorkers were starting to work. And when New York and the West Coast were both at work was the slowest period of all."

AND NOW FOR SOMETHING COMPLETELY CHAOTIC

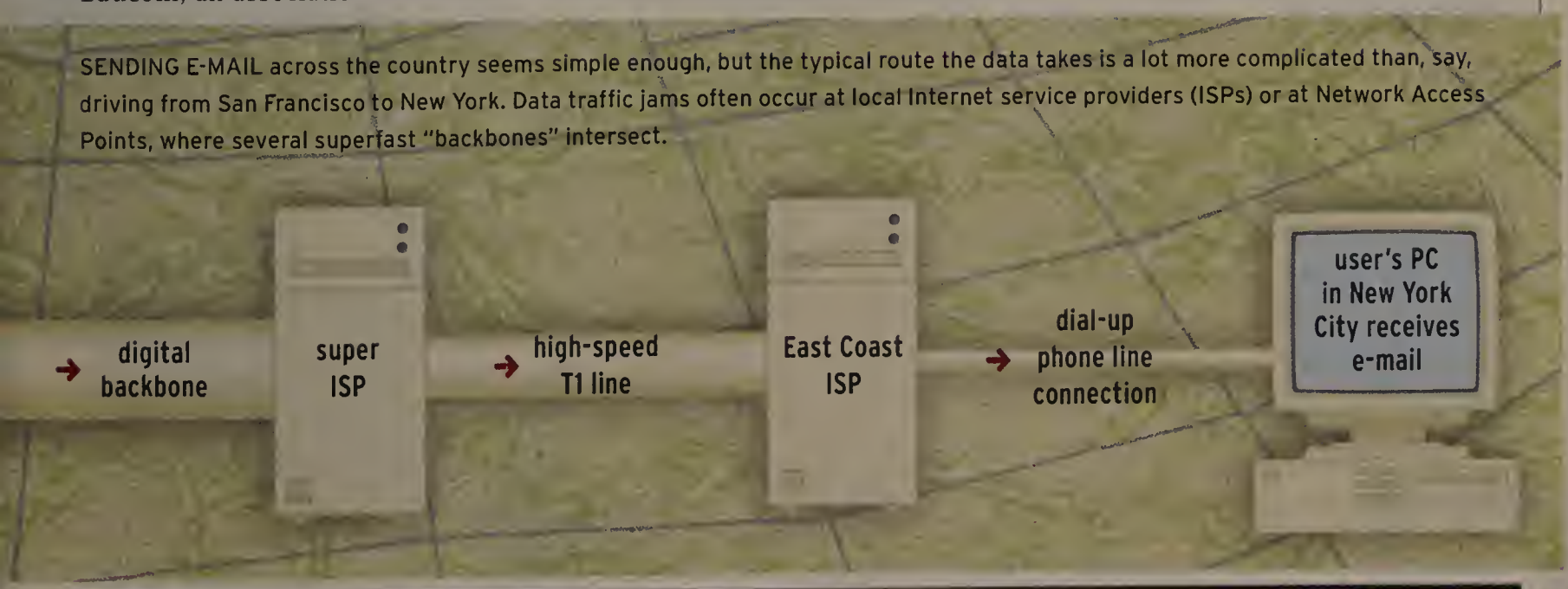
TO UNDERSTAND why Internet bottlenecks occur, it helps to have a basic understanding of how the Net is constructed. So what *does* the Internet look like? ▶



MIKE ROBERTS, *Educom*

No collapse, but... "At a minimum, we're in for a lot of **bad hair days** on the Internet."

SENDING E-MAIL across the country seems simple enough, but the typical route the data takes is a lot more complicated than, say, driving from San Francisco to New York. Data traffic jams often occur at local Internet service providers (ISPs) or at Network Access Points, where several superfast "backbones" intersect.



CHECKLIST

Avoid the Speed Limit

SHOP CAREFULLY for an Internet service provider. Before signing up, ask the ISP representatives to fax you a map that pinpoints their network's proximity to the major Internet backbone providers. The more direct the connection, the less likely you'll experience service slowdowns.

SCHEDULE YOUR ACCESS to avoid peak periods. Those periods are usually late afternoon and evening on the East Coast and late afternoon on the West Coast.

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Even columnist Metcalfe has tempered his apocalyptic predictions. Reached at his home, Metcalfe still firmly believes the Internet is heading for a collapse—but he defines this as a situation in which "hundreds of thousands of people can't access the Internet for a morning or an afternoon or a whole day."

"At a minimum," says Mike Roberts, vice president of Washington D.C.'s Educom, an association that sets net-

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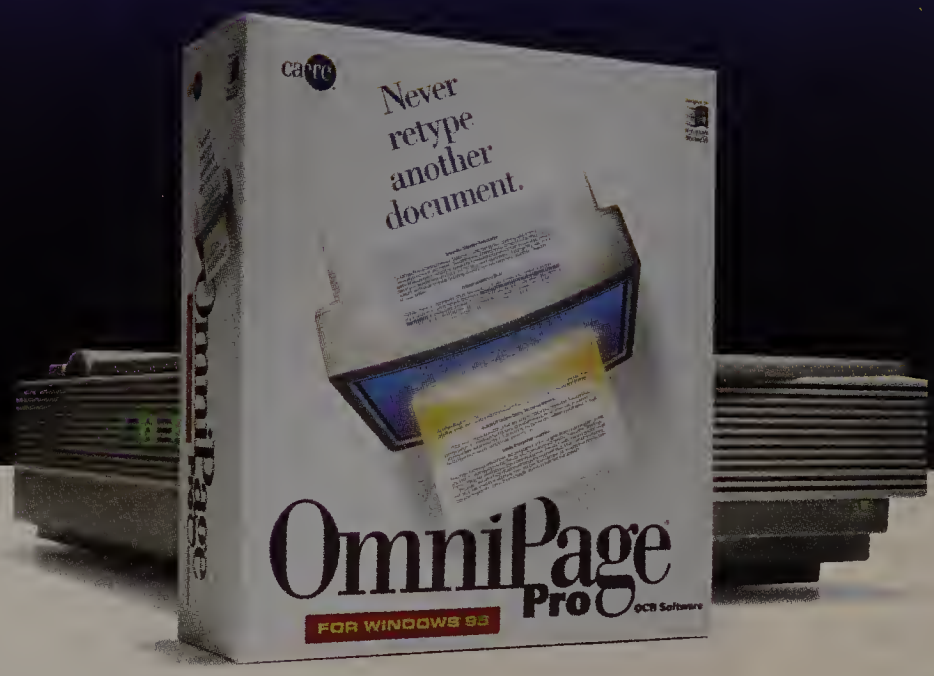

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Circle 91 on reader service card

"Like something devised by Monty Python," says Paul Saffo, a director at the Institute for the Future, in Menlo Park, California. "It's a direct violation of the senses for those who believe the universe is structured in an orderly way."

At its base level, the Internet is a conglomeration of small and large computer networks. Most users access the Net via Internet service providers, or online services. The ISPs typically connect to one of about a dozen *super ISPs* such as MCI, Performance Systems International, Sprint, or Uunet Technologies. Each super ISP maintains its own high-speed network, called a *backbone,* which can shuttle packets of data at speeds of up to 155 megabits per second—or roughly 750,000 double-spaced, typed pages. The large commercial online services also maintain their own backbones.

All these networks connect to each other via a series of public and private Network Access Points, where machines *route* the data from one backbone to another. Thus, a typical Internet e-mail message could travel from its author's PC to a machine at a local service provider, then to a super ISP. From there it may be routed between several different backbones before it reaches its final destination, a machine at another local ISP where the recipient can log on to retrieve it (see "Untangling the Net" for an illustration).

Traffic bottlenecks typically occur at the access points, especially public NAPs that are shared by several Internet providers. When routers at these sites become overloaded, they can drop data packets, causing the data to be automatically retransmitted by the host computer, making the problem even worse. Or the packets might be directed to other routers on the Internet, a process that can create packet pile-ups elsewhere. ▶

Marc Andreessen Isn't Worried

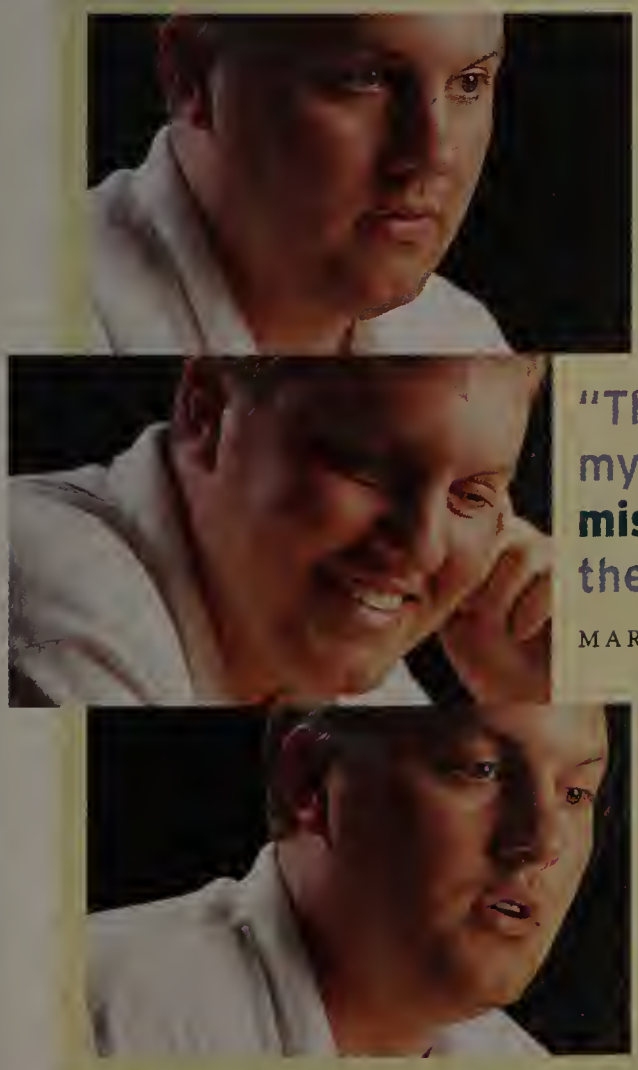
WE CAUGHT UP WITH Marc Andreessen, Netscape's vice president of technology, at his company's headquarters in Mountain View, California. When asked what he thought about a possible Internet meltdown, he replied, "That is the biggest myth!" Here are highlights from that interview:

PC WORLD: You've probably encountered these complaints before.

MARC ANDREESSEN: There's a long-running joke on the Internet that goes back 15 years. "Death of the Net Predicted. GIF at 11 o'clock!" This pops up every year or two; this is just the first time that it's ever actually hit the public's consciousness. This myth is based on a fundamental misunderstanding of what the Net is and how it works.

PCW: But now the government has begun to turn over a lot of the backbone of the Net to private companies, and the backbone is essentially private, at this point.

MA: There's a whole set of parallel backbones right now. There's an AT&T backbone. There's an MCI backbone. There's a Sprint backbone. There's a CompuServe backbone. And so on. There's also an education backbone, which the government continues to fund. Any backbone may start having more demand than it has the capacity to supply, in which case they increase the bandwidth.



"This [collapse of the Net] myth is based on a misunderstanding of what the Net is and how it works."

MARC ANDREESSEN, *Netscape*

There is no limitation on bandwidth. Demand ramps up; supply expands. And supply can expand, because there's nothing stopping it.

PCW: Isn't it conceivable that somebody could bring the Internet to its knees with massive transmissions?

MA: They could, but they would have to be leasing a very high amount of bandwidth. It would be incredibly costly, because to have an impact on the infrastructure, you'd need at least a T3 [line] on both sides.

PCW: Can't you imagine an AltaVista employee going postal?

MA: Right. But people are going to come up with new attacks, and others will come up with new defenses.

PCW: Do you believe that the free market will react effectively enough, or do you think it will be necessary for an outside organization or the government to step in and guarantee any kind of bandwidth availability and security measures?

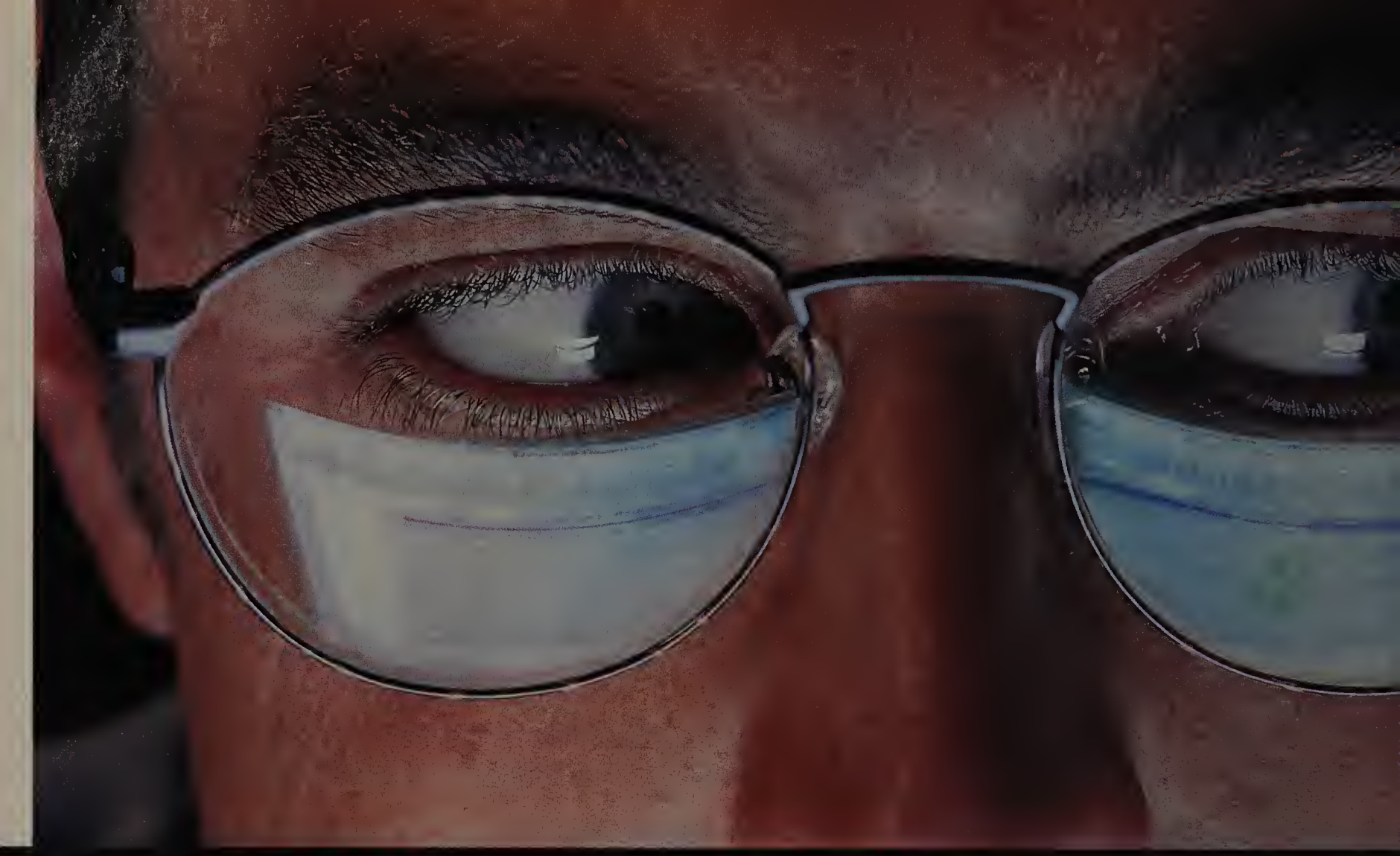
MA: The market will take care of it on the commercial side and in the general-purpose user/consumer/business aspects. The government's role, I believe, is to fund the networks used by educational research organizations. So the government ought to pay for regional networks connecting universities and let the market run its course on normal consumer and business data networking, and the government should just make sure that educational research institutions are able to benefit from that by funding it directly.

PCW: Five years down the road. 2001. How do you foresee most people are going to be getting onto the Net?

MA: My current guess is that the primary high-bandwidth access will be either through businesses with leased lines or through cable modems. *—Richard Overton*

Download a RealAudio version of this interview on PC World Online (http://www.pcworld.com). Do you think the Net is headed for disaster? Join us on the Net Overload message board (http://www.pcworld.com/inet_talk).

PHOTOS: ROBERT HOLMGREN



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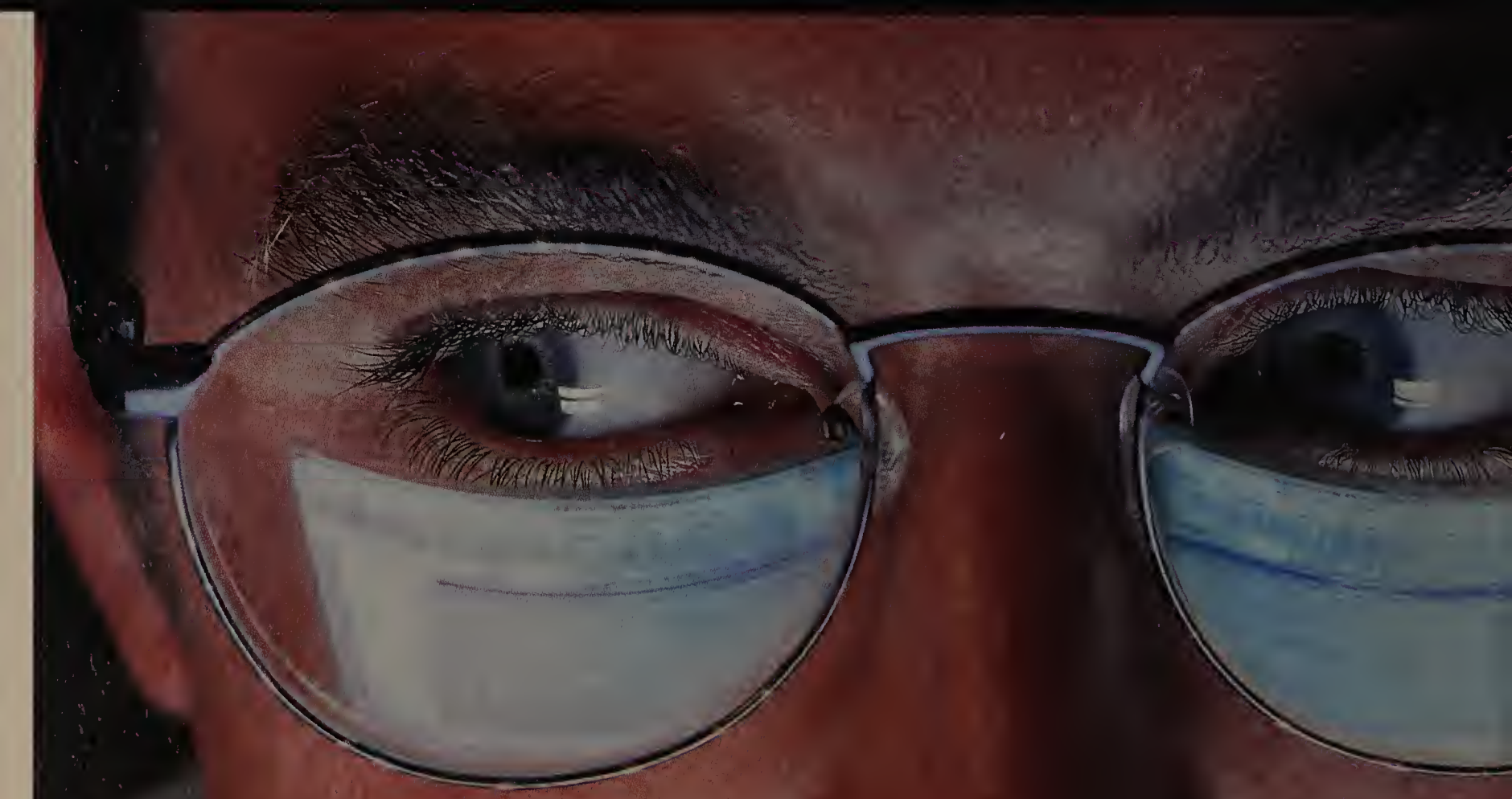

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Has It Changed Your Life Yet?

Circle 47 on reader service card

Internet traffic also chokes up at the smaller service providers, which usually maintain relatively slow data connections compared to the super ISPs.

"When there's a traffic problem on the Internet, it's usually a local phenomenon," says Hubert Delaney, a research director for The Gartner Group. During last winter's snowstorms, for instance, many people found themselves forced to work from home, relying heavily on their dial-up connections to the Internet via local ISPs. The greater demand on small local service providers reportedly caused minor brownouts.

"The more direct your connection is to an Internet backbone, the less likely you are to have problems," Delaney says.

Dror Matalon, who owns and operates Direct Network Access, an Internet service provider in Berkeley, California, disagrees. "While I'm sure that there are plenty of ISPs who don't have good connectivity, the cost of better connections (more T-1 lines, for example) is just a small part of the budget for a provider who has more than 500 customers."

The truth of the matter is, small ISPs are on the Endangered Species List. Many large ISPs are installing faster equipment and smarter routers (see "Repaving the Information Superhighway"), but implementing these solutions can be expensive and time consuming. And smaller ISPs that can't afford to lease enough capacity from the super ISPs or to upgrade their network servers may end up as roadkill.

PAY TO PLAY

SOMEBODY ULTIMATELY will have to foot the bill for upgrading the Net, and—brace yourself—the phone companies and other backbone operators aren't going to absorb this cost, but rather pass it on to the consumers. In other words, to you and me. In the future, you could be charged for Internet access in much the same way that you're charged for long distance phone service now.

"The service providers should be billing on a metered basis—by the hour, or the number of packets sent, or even the distance that packets are sent," says Metcalfe. "If revenues are based on an ISP's actual costs, then as demand increases, people will pay more, and the ISPs will be able to afford to upgrade their capacity to meet the demand."

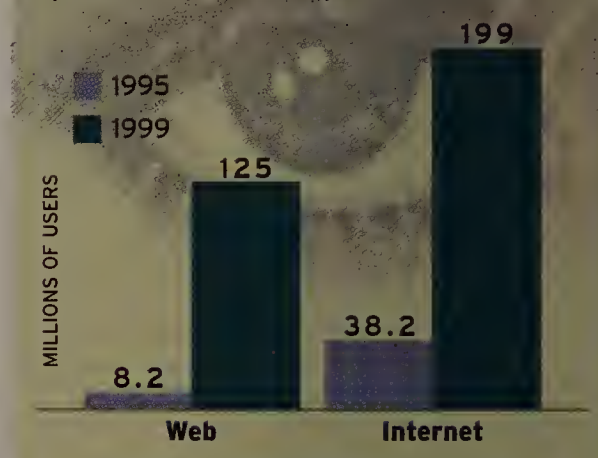
MCI's Director of Internet Marketing John Scarborough agrees that a per-use pricing structure is likely as the demand increases for bandwidth-intensive multimedia services such as video conferencing. But he adds that such a structure is two to four years in the future.

Paying for Internet access on a metered basis may seriously limit its use for educational and small business users, transforming the Internet into a system of haves and have-nots.

"If my university has to pay according to each use, it will have to put limits on my access," says Eli Bentor, assistant professor in the department of art at Winthrop University in Rock Hill, South Carolina. "That will certainly help with the traffic jams on the Internet—but it won't do me any favors." ▶

The Worst Is Yet to Come

THE NUMBER OF PEOPLE using the Internet is expected to quintuple in just five years, from approximately 40 million last year to nearly 200 million by the year 1999. The number of World Wide Web users is expected to increase by 15 times in the same period.



Source: International Data Corporation 1996

Who Owns the Internet?

ON DAYS WHEN YOUR INTERNET connection is intolerably slow, you've probably wanted to pick up the phone, call the company that runs the Internet, and demand to speak to the person in charge.

But you can't, because there is no one company in charge. In April 1995, the U.S. government turned over management of the Net's backbone to the private sector. Today, the Net is a diversified, global, tangled web of some 100,000 networks maintained by approximately 2700 Internet service providers—and a handful of government organizations. And just as there is no single company running the Internet, there is no governing body with the authority to set policies and impose rules. There are, however, some key players who have an impact on the Internet infrastructure. Who are they, and what are they doing to keep the Net from collapsing?

The providers. About a dozen top-tier commercial ISPs operate the most significant portions of the Internet backbone and are most responsible for maintaining and upgrading network capacity. Among these super ISPs are Advanced Networks and Services, Apex Global Information System, BBN Corporation, CERFnet, MCI, Performance Systems International, Sprint, and Uunet Technologies. No single player dominates, although a few (such as MCI, Sprint, and Uunet) are more entrenched and better financed than others.

Networking companies. Many networking technology companies play a more indirect, albeit important, role in the Internet's health. San Jose, California–based Cisco Systems is the leading vendor for routers and other equipment used by ISPs. Some worry that its routers are used too widely, however, and that software bugs or other problems with its products could potentially bring large portions of the Internet to its knees.

Organizations. A number of private and public organizations play key roles as well. The National Science Foundation funds research into technologies to create a class of service for Internet traffic (such as overnight mail or third class), improve network switches and routers, and divert traffic to special-use networks, such as NSF's own high-speed backbone. Similarly, the Internet Engineering Task Force, led primarily by academics and engineers, is the force behind new protocols that will let users reserve network capacity for high-bandwidth applications.

Other influential organizations are the Internet Society and the North American Network Operations Group. The former brings together government and business to confer on technology and economic development. NANOG is composed of ISPs and focuses on improving cooperation between its members.

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FULL STEAM AHEAD?

DESPITE THE TALK of meltdowns and brownouts, representatives at most of the businesses we contacted said they're moving ahead with their plans to integrate the Net even further into their operations.

Avex Electronics Inc., an electronics manufacturer in Huntsville, Alabama, is moving its Electronic Data Interchange transactions (invoicing, purchase orders, and the like) off a private leased-line phone network and onto the Internet.

"We've been using value-added networks for our EDI transactions, but there you're charged for how much you send," says Mike Gordon, manager of the electronic commerce group at Avex. "On the Internet we pay a [flat] monthly connect charge, regardless of usage. The difference between the two will save us thousands of dollars every month."

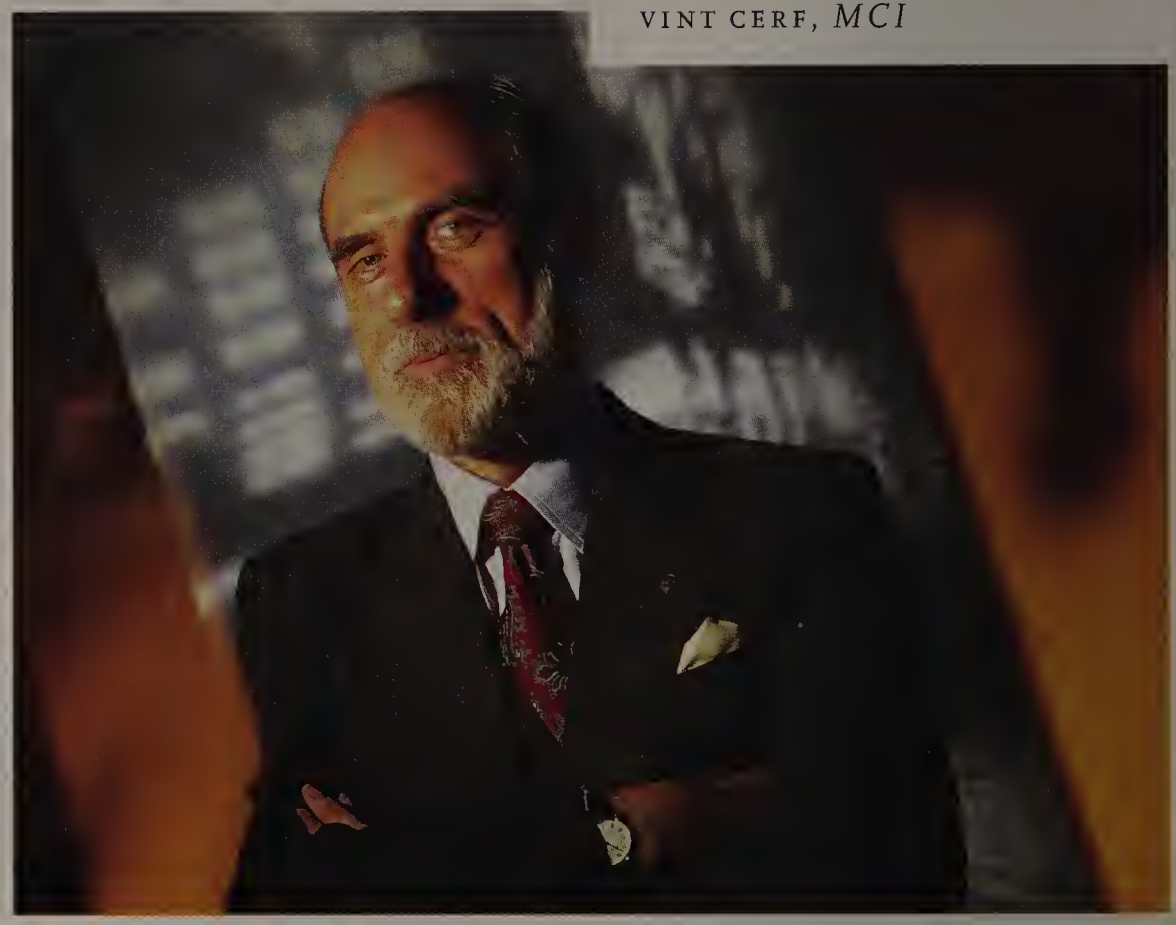
Gordon says Avex employees haven't experienced any noteworthy traffic jams or brownouts on the Internet. Nonetheless, he says Avex plans to maintain its leased network agreement indefinitely—just in case the Net "collapses under the volume of traffic it's getting."

"The frustration level has been growing steadily this year," admits Dana Abrams, director of global initiatives for Rockwell International's Information Systems Center in Seal Beach, California. "In the middle of the day, at peak times, we experience anywhere from 3- to 5-minute delays getting onto the Net. People who are trying to do research are finding that they can't always get to the sites they need, so they give up and try again later.

"But what's the alternative?" he wonders. "Is it faster to get in your car and drive to the library, or to try a couple of times to get to a Web site and download the information from there? The fact of the matter is, there are problems with the Internet. It can be slow, and it can be frustrating, but we believe that the situation is going to get better." ■

"Internet providers are trying to upgrade their network backbones before the demand rises again."

VINT CERF, *MCI*



Repaving the Information Superhighway

A NUMBER OF TECHNOLOGIES available now or in the near future promise to make traffic flow more smoothly on the Internet.

Asymmetrical Digital Subscriber Line. This technology promises speeds of 6 to 10 Mbps over standard telephone lines by varying the amount of traffic going in each direction. Beginning in 1997 you should be able to set up an ADSL service account with an ISP or local telephone company.

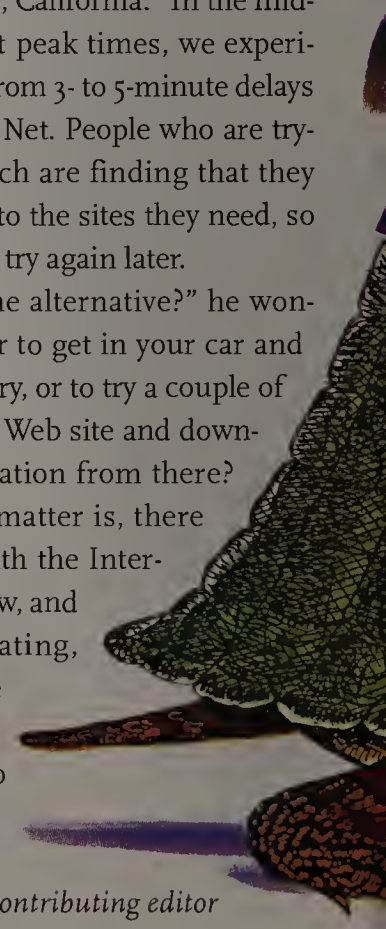
Asynchronous Transfer Mode. This high-speed method of simultaneously transmitting voice, video, and data is being deployed at Network Access Points and by super ISPs along their backbone networks. But ATM can be extremely expensive—an ATM switch costs about $200,000, for instance, while a typical router on an Ethernet network costs about $30,000.

Internet Protocol version 6. The flood of users has caused shortages of Internet Protocol numbers, or addresses. Just as every telephone needs a phone number, each computer on the Net needs an IP number. But with all the new machines hooking up to the Net, the numeric possibilities in the current IP scheme are nearly exhausted. IPv6 creates a wider pool of available numbers; estimates are that about 50 percent of ISPs will upgrade their software with IPv6 by late 1997.

Network Address Translation. Another solution is a NAT, a device that decides the best route for each data packet, letting routers focus on shuttling the packets to their ultimate destination. Cisco Systems offers a NAT device called the Private Internet Exchange.

Private networks. @Home, a Silicon Valley start-up, plans to offer real-time multimedia content over the Net at 10 Mbps per second—about 500 times faster than today's modems. The service, which will use cable modems and a private hybrid fiber coaxial network, is still in the testing phase. US West Communications, a Denver-based telephone company, is working on a similar service.

Resources Reservation Protocol. Loosely abbreviated as RSVP, this technology enables bandwidth on demand. With RSVP, when you invoke a video-conferencing session, your PC alerts your ISP's network and reserves a high bandwidth. BBN Planet Corporation will be one of the first RSVP providers when it makes its service available in mid-1997.



Jim Martin is a contributing editor for PC World. *Richard Overton is a PC World Online staff editor.*

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- Microsoft Works 95 CD

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- 32MB EDO RAM • 2GB Fost SCSI-2 hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)
- Microsoft Office Pro 95 & Bookshelf 95 CDs

$3,199 Business lease $109/manth

- 64MB EDO RAM • 4GB Fost SCSI-2 hord drive
- 17" Micron 17FGx, .26dp (15.8" display)
- Microsaft Office Pro 95 & Baokshelf 95 CDs

$4,249 Business lease $145/month

- With 166MHz Pentium processor.....subtroct $100

Home MPC™ P133

- Intel 133MHz Pentium ® processor
- 256KB pipeline burst coche, flosh BIOS
- **16MB EDO RAM** • 1.2GB EIDE hord drive
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speokers
- 28.8 fox/modem, speokerphone, voice moil
- Microsoft® Phone telephony softwore
- Internet reody:
  Internet in a Box from CompuServe®/Spry Internet Explorer
- Prodigy®, Americo Online® & CompuServe triol memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO
- 15" Micron 15FGx, .28dp (13.7" disploy)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboord
- Microsoft Windows® 95 & MS® Plus! CD
- Quicken® Finonciol Pak includes: Quicken Deluxe 5.0; Quicken Financiol Planner™; Quicken Porents' Guide to Money™; Quicken Fomily Lowyer™
- Microsoft Home Pok includes: Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encorto® 96; Encorto 96 World Atlos; Music Centrol™ 96; Wine Guide; Arcade 1.0; Scenes–Sports Extremes Collection; Cinemonia® 96; Julio Child Home Cooking; Best of Windows Entertoinment Pock; CD Sompler (including Fury³ gome demo)
- 5-yeor/3-yeor Micron Power℠ warronty

$1,999

- With 166MHz Pentium processor.....add $200

Home MPC™ P200

- Intel 200MHz Pentium processor
- 256KB pipeline burst coche, flosh BIOS
- **32MB EDO RAM** • 2.1GB EIDE hord drive
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit 3D Wavetable stereo sound cord
- Advent AV270 2x25 wott stereo speakers
- 28.8 fox/modem, speokerphone, voice moil
- Microsoft Phone telephony softwore
- Internet reody:
  Internet in a Box from CompuServe/Spry Internet Explorer
- Prodigy, Americo Online & CompuServe triol memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO
- 15" Micron 15FGx, .28dp (13.7" disploy)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf® 95 CDs
- Quicken Financiol Pok includes: Quicken Deluxe 5.0; Quicken Finoncial Plonner; Quicken Parents' Guide to Money; Quicken Family Lowyer
- Microsoft Home Pok includes: Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encorto 96; Encorto 96 World Atlas; Music Centrol 96; Wine Guide; Arcade 1.0; Scenes–Sports Extremes Collection; Cinemonia 96; Julio Child Home Cooking; Best of Windows Entertoinment Pock; CD Sompler (including Fury³ game demo)
- 5-yeor/3-year Micron Power warranty

$2,899

- With 166MHz Pentium proces...

NEW

January 9, 1996 Millennia Line

June 25, 1996 Millennia P166

June 25, 1996 Millennia P133

August 1996 Millennia TransPort P133

May 30, 1995 Millennia P120

May 16, 1995 Home MPC P90

January 1996 Millennia P133

April 1996 Millennia TransPort

July 1996 Millennia P166

January 1996 PowerServer SMP P133

June 1996 Millennia P166

May 1996 Home MPC P133

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Any PC maker can claim to offer a solution that covers your needs. But at Micron Electronics, we prefer to let our history and our products speak for themselves. We think you'll agree it's an impressive story.

Superior Technology—A Micron Tradition

Micron builds PCs with a legacy of excellence. Our manufacturing processes grew out of nearly two decades in the semiconductor business, where precision is measured in millionths of an inch, and quality in parts per million. We've built strategic relationships with companies like Intel, Microsoft and Novell. From this solid background, we're forging unbeatable systems you can count on today and tomorrow. Best of all, we just doubled our memory and added powerful enhancements to several of our systems (see configurations). This industry-leading approach gives you a vast increase in system capacity.

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In the past two years, leading industry publications have applauded Micron PCs with more than 140 awards for product performance, customer service and support. This includes *PC Magazine* Best Products of 1995 and Editors' Choice awards in several categories. Add more than 40 *PC World* Best Buy awards and you've got an impressive technology hall of fame. In fact, just this summer, Micron has won three *PC Magazine* Editors' Choice® Awards for Millennia™ desktop and Millennia TransPort™ notebook computers—an unprecedented achievement for Micron.

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After your purchase, the story continues. Just ask *PC Magazine* readers. They bestowed on us the coveted Readers' Choice for Customer Service and Reliability in 1994 and 1995. And *PC World* recently awarded us first tier status along with the likes of Apple, Compaq, Digital and HP. Pretty good company, wouldn't you say?

RELIABILITY RANKING

1ST TIER
APPLE | COMPAQ | MICRON | DIGITAL | HEWLETT PACKARD

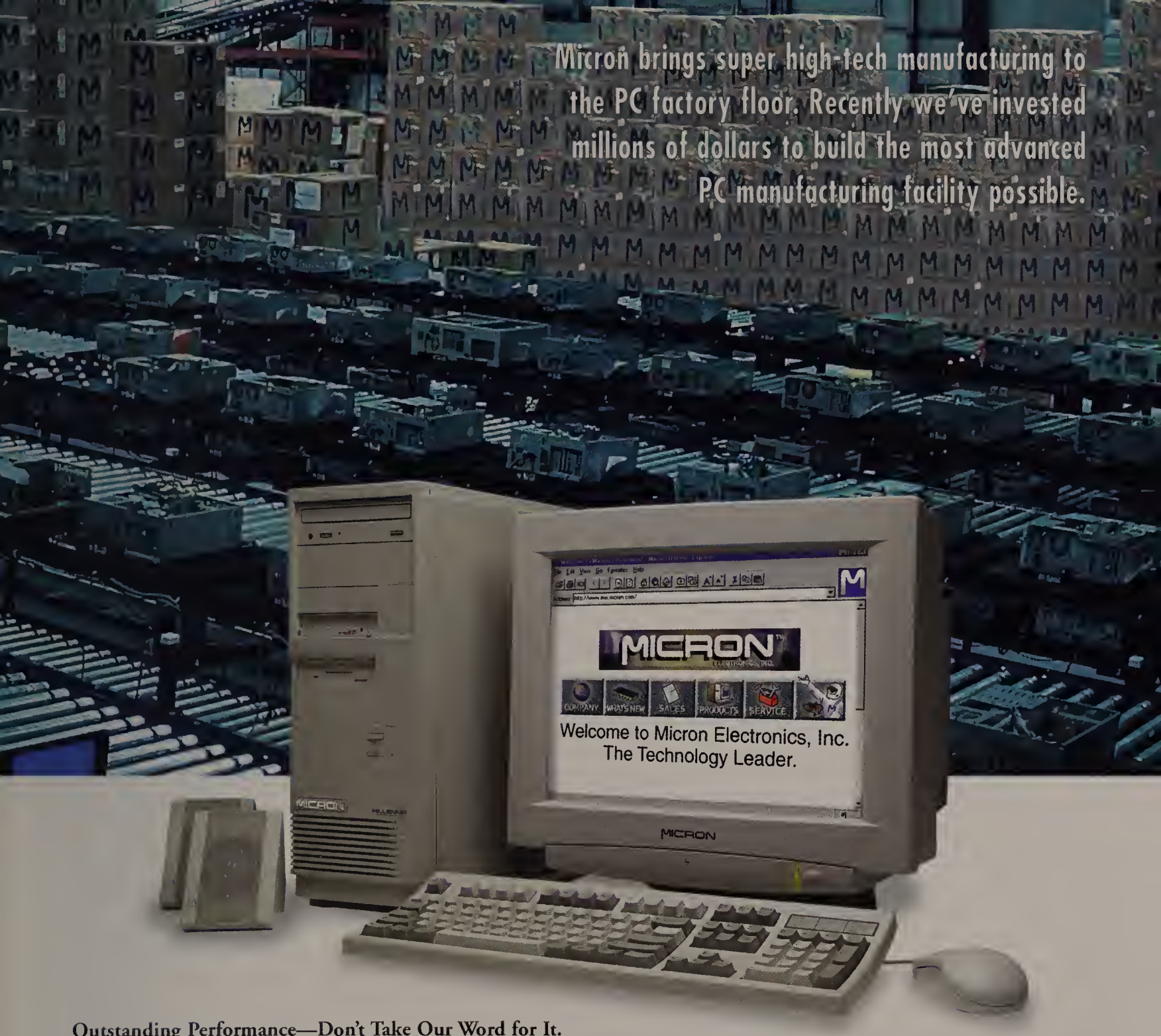
2ND TIER
AST | DELL | IBM | NEC

3RD TIER
ACER | LEADING EDGE | GATEWAY 2000 | PACKARD BELL

Source: *PC World* Reliability & Service Monitor, May 20 - November 20, 1995

Micron Power℠ Warranty—An Industry First

We support our reliability promise with the industry-leading Micron Power warranty. It backs the microprocessor and main memory for five years, an industry first. Add a three-year, parts-only system warranty and a 30-day money-back guarantee, and you can rest assured that you're in good hands.



Outstanding Performance—Don't Take Our Word for It.
Talk is cheap when you're speaking for yourself. But when it's from the mouth of an industry expert, it carries weight. Here are a few of many examples of what they're saying about Micron PCs:

Micron Home MPC *". . . the fastest we've ever tested . . . as well as a marvelous family package . . . it wins our Top Rated award. . . ."* ***—Family PC,*** **May 1996**

Micron Millennia *"In short, Micron covers all the bases with this Best Buy."* ***—PC World,*** **March 1996**

Micron PowerServer *"This is definitely a best buy."* ***—Computer Shopper,*** **January 1996**

Micron Millennia TransPort *". . . nearly a dead ringer for IBM's ThinkPad . . . but performs better and saves you about $2,500."* ***—PC Magazine,*** **April 1996**

The Right System for You
Micron makes a suite of outstanding solutions designed for the way you work or play. From home systems to servers, desktop PCs to portable multimedia solutions, Micron always comes through with a system built to satisfy. For details and prices, turn the page.

Micron Power℠ Warranty & Support

- 5-year limited warranty on microprocessor and main memory
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- 30 days of free Micron-supplied software support for Micron desktop systems; 3 free network operating system incident resolution calls for Micron server systems
- 30-day money-back policy
- 24-hour technical support

The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions of sale. Terms and conditions of sale may vary for specific configurations. Copies of the limited warranties may be obtained on our Web site or by calling Micron.

intel inside
pentium PROCESSOR

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ELECTRONICS, INC.

800-249-1176
http://www.mei.micron.com

MILLENNIA TRANSPORT™ P133

- 133MHz Mobile Intel Pentium® processor
- Intel 430MX PCI chipset
- 256KB L2 pipeline burst coche
- 16MB EDO memory (48MB mox.)
- BX modulor CD-ROM drive
- PCI grophics occelerotor, 1MB EDO memory
- Pick-o-Point™ duol pointing devices integrote both pointing stick ond touchpod
- Removoble EIDE hord drive (1.2GB mox.)
- 3.5" modulor floppy drive
- Intelligent modulor lithium-ion bottery
- 16-bit stereo sound
- Built-in stereo speokers ond microphone
- 2 Type II or one Type III PCMCIA slots
- S-Video ond NTSC video-outputs
- Heodphone, microphone ond line-in jocks
- 2 infrored ports, one front, one bock
- Porollel, seriol, VGA ond 2 PS/2 ports
- Dimensions: 11.7" x 9.4" x 2.0", Weight: 6.9 lbs.†
- Nylon corrying cose
- Microsoft® Windows® 95 ond MS® Plus! CD
- Microsoft Office Pro 95 ond Bookshelf® 95 CDs
- Kensington™ security lock††
- 5-yeor/3-yeor Micron Power℠ limited worronty

† 6.9 lbs. includes 3.5" floppy and one battery
†† Lock secures both Millennia TransPort and MicronDock

PC MAGAZINE EDITORS' CHOICE
AUGUST 1996
MILLENNIA TRANSPORT P133

- 16MB EDO memory (48MB mox.)
- 12.1" octive motrix disploy, 800 x 600
- 1.2GB removoble hord drive

$4,399 Business lease $150/month

- 32MB EDO memory (48MB mox.)
- Motorolo® Montono 28.8 fox/modem
- 12.1" octive motrix color disploy, 800 x 600
- 1.2GB removoble hord drive
- 2nd lithium-ion bottery

$5,199 Business lease $163/month

OPTIONS

- With 150MHz Pentium processor .....odd $200
- With Motorolo Montono 28.8 fox/modem.....odd $299
- With 3Com® Ethernet 10BT PCMCIA .....odd $149
- With Somsonite® leother corrying cose .....odd $99
- With 2nd modulor lithium-ion bottery.....odd $199
- With 2nd 1.2GB hord drive.....odd $599
- With 2nd 2.0GB hord drive.....odd $699
- With 16MB DIMM module upgrode.....odd $349
- With 32MB DIMM module upgrode.....odd $749
- MicronDock™ multimedio port replicotor .....odd $299
- MicronExec™ desktop pockoge .....odd $799

POWERSERVER SMP-N P133

- Intel 133MHz Pentium® processor
- Duol Pentium SMP ZIF sockets
- 512KB write-bock coche, flosh BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- Adoptec PCI 32-bit Ultro SCSI Fost-20 controller
- 8X SCSI-2 CD-ROM drive
- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com® 3C595 PCI 10/100 Ethernet NIC
- Full-size tower with 10 drive boys
- Microsoft® Mouse, 104-key keyboord
- Novell® NetWore 4.1 (5 user license)
- NOS support (3 free resolutions)
- 5-yeor/3-yeor Micron Power℠ worronty

- 16MB RAM • 1GB SCSI-2 hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)

$3,999 Business lease $136/month

- 32MB RAM • 2GB Ultro SCSI hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)

$4,799 Business lease $163/month

POWERSERVER SMP-N P266

- Duol 133MHz Pentium processors
- 512KB write-bock coche, flosh BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- Adoptec PCI 32-bit Ultro SCSI Fost-20 controller
- BX SCSI-2 CD-ROM drive
- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com® 3C595 PCI 10/100 Ethernet NIC
- Full-size tower with 10 drive boys
- Microsoft® Mouse, 104-key keyboord
- Novell® NetWore 4.1 (5 user license)
- NOS support (3 free resolutions)
- 5-yeor/3-yeor Micron Power℠ worronty

- 32MB RAM • 2GB Ultro SCSI hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)

$4,999 Business lease $170/month

- 64MB RAM • 4GB Ultro SCSI hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)

$5,899 Business lease $185/month

intel inside
pentium PROCESSOR

MILLENNIA™ PRO200

- Intel 200MHz Pentium® Pro processor
- 256KB internol coche, flosh BIOS
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speokers
- **PCI 64-bit 3D video, MPEG, 4MB EDO**
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboord
- Microsoft Windows NT® Workstotion CD or Windows® 95 & MS® Plus! CD
- 5-yeor/3-yeor Micron Power℠ worronty

- 16MB EDO RAM • 1.2GB EIDE hord drive
- 15" Micron™ 15FGx, .28dp (13.7" disploy)
- Microsoft Works 95 CD

$2,399 Business lease $82/month

- 32MB EDO RAM • 2.1GB EIDE hord drive
- 17" Micron 17FGx, .26dp (15.8" disploy)
- Microsoft Office Pro 95 & Bookshelf® 95 CDs

$3,049 Business lease $104/month

MILLENNIA™ PRO200 PLUS

- Intel 200MHz Pentium Pro processor
- 256KB internol coche, flosh BIOS
- PCI 32-bit Ultro SCSI Fost-20 controller
- 8X SCSI CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speokers
- **PCI 64-bit 3D video, MPEG, 4MB EDO**
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboord
- Microsoft Windows NT Workstotion CD or Windows 95 & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-yeor/3-yeor Micron Power worronty

- 32MB EDO RAM • 2GB Fost SCSI-2 hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)

$3,499 Business lease $119/month

- 64MB EDO RAM • 4GB Fost SCSI-2 hord drive
- 17" Micron 17FGx, .26dp (15.8" disploy)

$4,549 Business lease $155/month

- 128MB EDO RAM • 9GB Fost SCSI-2 hord drive
- 21" Micron 21FGx, .26dp (20.0" disploy)

$7,649 Business lease $240/month

CLIENTPRO™ P100

- Intel 100MHz Pentium® processor
- 256KB pipeline burst coche, flosh BIOS
- 3Com® 3C509 Combo network odopter
- 3.5" floppy drive
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboord
- MS-DOS® 6.22/Windows® for Workgroups 3.11
- 5-yeor/3-yeor Micron Power℠ worronty

- PCI 64-bit grophics occelerotor (2MB EDO)
- 8MB EDO RAM • 1.2GB EIDE hord drive
- 14" Micron 14FGx, .28dp (12.9" disploy)
- Microsoft Works preinstolled

$1,499 Business lease $51/month

- PCI 64-bit grophics occelerotor (2MB EDO)
- 16MB EDO RAM • 2.1GB EIDE hord drive
- 15" Micron 15FGx, .28dp (13.7" disploy)
- Microsoft Office Pro 4.3 preinstolled

$2,018 Business lease $69/month

- With 133MHz Pentium processor.....odd $100

CLIENTPRO™ P200

- Intel 200MHz Pentium processor
- 256KB pipeline burst coche, flosh BIOS
- 3Com 3C509 Combo network odopter
- 32MB EDO RAM • 3.1GB EIDE hord drive
- 3.5" floppy drive
- 8X EIDE CD-ROM drive
- PCI 64-bit grophics occelerotor (2MB EDO)
- 17" Micron 17FGx, .26dp (15.8" disploy)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboord
- Microsoft Windows NT® Workstotion
- Microsoft Office Pro 95 & Bookshelf® 95 CDs
- 5-yeor/3-yeor Micron Power worronty

$3,257 Business lease $111/month

- With 166MHz Pentium processor....subtroct $100

intel inside
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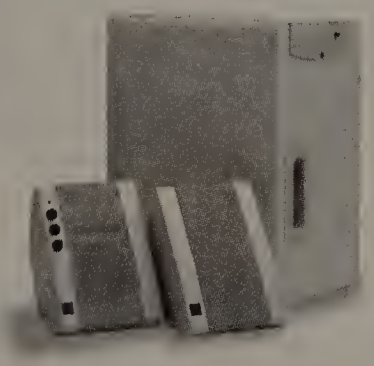
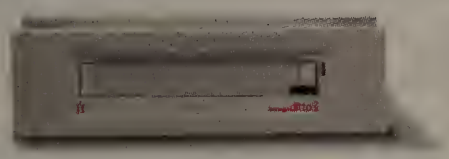
Multimedia Options

- 16-bit 3D Wavetable stereo sound.. $59*
- 16-bit 3D Wavetable stereo soundcord w/2MB RAM $99*
- Advent AV270 Powered Partners stereo speakers $99
- Advent AV370 Powered Partners stereo speakers w/subwoofer $199
- Microsoft® SideWinder™ 3D Pro joystick $59



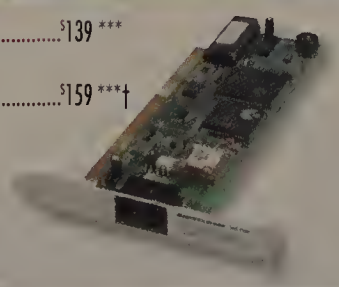
Storage/Media Options

- Adaptec 2940U Ultra SCSI Fast-20 contraller $100
  (upgrade from system with standard Ultra SCSI Fast-20 controller)
- Plextar 8Plex 8X 1.2MB/S SCSI internal CD-ROM drive $200 **
  (upgrade from systems with standard 8X EIDE CD-ROM drive)
- Iamega Jaz SCSI drive with 1.0G8 remavable cartridge $399 **
- Iomega Zip IDE drive with 100MB removoble cartridge $99
- Iamega Ditta 800 (400/800MB) Travan Tape back up w/tape $149
- Iomega Ditta 3200 (1.6/3.2G8) Travan Tape back up w/tape $199
- Sany 4/8G8 DDS-2 DAT SCSI Tape back up w/tape $999 **



Communication Options

- 28.8bd V.34 internal data/fax modem $139 ***
- 28.8bd V.34 internal telephany data/fax modem
  w/full duplex speakerphone and voice mail $159 ***†

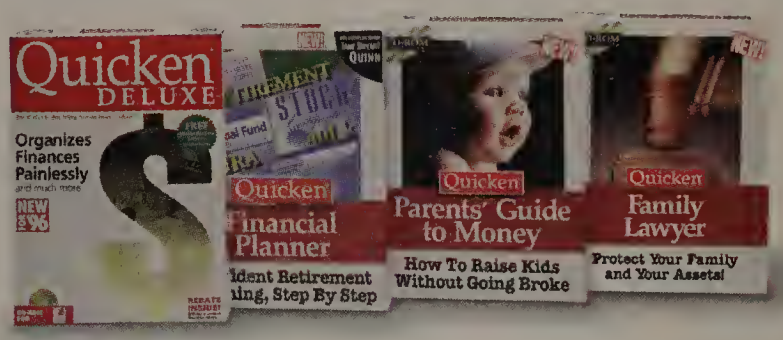


Networking Options

- 3Com® 3C509 Ethernet ISA NIC (BNC, AUI & RJ-45) $99
- 3Com 3C595 Fast Etherlink PCI 10/100 NIC (RJ-45 only) $159
- SMC ISA TokenCard network card $199

Quicken® Financial Pak

- Quicken Finoncial Pak, including: Quicken Deluxe 5.0; Quicken Financial Planner™; Quicken Parents' Guide to Maney™; Quicken Family Lawyer™ $69



Display/Video Options

- 17" Hitachi SuperScan 1711 (15.9" display) .26dp calar monitar $150 ††
- 21" Hitachi SuperScan 2111 (20" display) .26dp calar manitar $1,050 ††
- Diamand Stealth64 videa card w/2MB VRAM $150 †††
- Diamand Stealth64 videa cord w/4M8 VRAM $300 †††
- #9 Imagine 128 series II video card w/4M8 VRAM. $500 †††
- #9 Imagine 128 series I videa card w/8M8 VRAM $750 †††

Millennia TransPort™ Options

- MicranDack™ multimedia part replicotar: Ethernet LAN adapter, SCSI-2port, S-Videa and NTSC videa autput, built-in stereo speakers, infrared port, headphane, micraphane, line-in jacks, parallel, serial, VGA and 2 PS/2 parts $299
- MicranExec™ desktap package: Matching black 17" monitor (15.8" display) with matching black mause, mausepad and keyboard (can be used with ar withaut MicranDack) $799
- Matarala Mantana 28.8 fax/modem supparts regular telephane cannectians, cellular phones and twa-way poging devices $299

Service Options

- Extended 2-year an-site service coverage far desktop systems $99
  (upgrade from aptianal 1-year an-site service coverage)
- Extended 3-year an-site service coverage far desktap systems $139
  (upgrade from aptianal 1-year an-site service coverage)
- Complete an-site PC installatian (call Micran far details) $159

Other Options

- APC Per7T surge suppressar $39
- APC Pra7T surge suppressar $59
- Micrasaft Natural Keyboard® $49
  (upgrade from standard keyboard)

* Upgrade from systems with standard 16-bit stereo sound card
** Requires SCSI Hast Adapter
*** V.34 modem includes trial memberships to CampuServe®, Pradigy® and America Online®
† Requires sound card
†† Upgrade from systems with standard Micran 17" 17FGx color manitar
††† Upgrade from systems with standard 64-bit 2MB videa card

Options and accessories available with systems purchase only.

Circle 160 on reader service card

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• Purchase Order Fax 208-893-8992
• GSA Contract #GS3SF4317D
• Technical Support Available 24 Haurs A Day–7 Days A Week
• Technical Support E-mail: techsuppart.meic@micron.cam

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Office in a Box

Multifunction devices sound great—a printer, fax machine, scanner, and copier all in one cheap, space-saving box. But of the six models we review, only one gets the thumbs-up.

BY DAN LUTZ

SMALL AND HOME BUSINESSES often run out of a tiny, cramped office, yet they still need to use a printer, a fax machine, a copier, and perhaps a scanner and fax-modem. That's a lot of stuff. Even if you have the space for this herd of hardware, laying out the cash—anywhere from $200 to $1000 for each machine—might break your budget.

One solution is a multifunction device. An MFD squeezes all these capabilities into one low-priced box that looks like a fax machine with a printer port grafted onto it, or a printer with a fax and a scanner shoehorned into the case. We sampled six low-end MFDs and decided that in only one case did the money and space savings make up for the limited features and ease of use. ▶

ILLUSTRATION BY GEOFF SPEAR

TO MULTIFUNCTION OR NOT TO...

A MULTIFUNCTION IS A GOOD DEAL only if your work is limited to basic text documents. And the ink jets aren't meant for high volume; if you print, fax, and copy more than 75 pages per day, you're better off with a laser MFD or stand-alone machines. If you already have a printer or fax machine, consider products that will fill in for the rest, such as the Lumina Series 2000 or the Panasonic KX-PS600 (see "Multifunctions That Fill the Gaps").

This roundup tested low-end MFDs meant for individual users and includes three monochrome ink jets (HP's $599 OfficeJet 350, the $1195 JetFax 4, and the $549 Xerox Document WorkCenter 250); two color ink jets (the $599 Canon MultiPass C2500 and the $1100 Ricoh MV74); and one laser (Sharp's $1061 F-2700M). Two new laser-based multifunctions—the Brother MFC-4550ML and the Toshiba TF601—weren't ready for review.

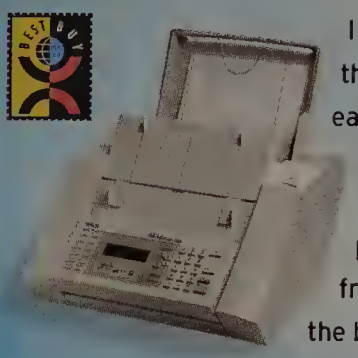
THE SUM OF THEIR PARTS

WHEN YOU TRY TO FIT SO MUCH equipment into so little space, something has to give. After a battery of speed, print quality, and hands-on testing, it was clear that the low-end MFDs we tested sacrifice capabilities to save costs. None of their functions compare well with stand-alone machines. We found kludges in the software and kinks in the hardware that compromise ease of use. The MFD that makes the most sense is the Xerox Document WorkCenter 250. It earns a Best Buy because its software-based control center makes it easy to use, it's affordable at $549, and its output quality is acceptable for most purposes.

We tested the six multifunctions for printing, faxing, copying, and scanning and compared them to representative stand-alone machines. The printers we used for comparison were the Panasonic KX-P6100 laser and the HP DeskJet 820Cse ink jet—our current Top 10 Personal Printer review's monochrome and color Best Buys. Our baseline scanner was the Logitech PageScan Color, a Best Buy from April's personal scanner review. We normally don't test fax machines and copiers, so we selected commonly used models—the Xerox 5334 copier, and the Pitney Bowes 9300 fax machine, which comes with a 9.6-kbps fax-modem.

Multifunctions tempt shoppers because of their low prices, and new models are popping up every day to feed the demand. Based on our shopping experiences, here's what to expect and what to look for.

BEST BUY



IN AN OTHERWISE mediocre field, the Xerox Document WorkCenter 250 earns a Best Buy for its successful balance of features and ease of use. Its software control panel makes it simple to employ any function, and the front control panel on the machine is the best of the bunch. The Xerox's output quality is adequate, and its speed is about average. In addition, its $549 street price is the lowest of the MFDs we reviewed.

SHOPPING SMART

JUST THE FACTS

Information please? Finding what you need to make a well-informed purchase is anything but easy. When you go to the store, the multifunctions will probably be crowded together on a shelf without PCs attached, so you can't try them. At most, you'll take away a sheet of sample output or a spec leaflet. Salespeople aren't always the best resource; we heard one erroneously tell a Macintosh owner that the HP OfficeJet, "like all HP products," is Mac compatible. Don't rely on the vendors' Web sites, either; when we logged on, they had sketchy information at best. When we called the vendors' product information lines, however, the staffs were knowledgeable and helpful. As the ultimate safeguard, make sure the store has a generous return policy. ▶

MULTIFUNCTIONS THAT FILL THE GAPS

THERE'S MORE THAN ONE WAY to multifunction. If you already have one or two office machines, these two alternatives can fill the gaps: the Lumina Series 2000 Model 2096, a device that works with your existing printer; and the Panasonic KX-PS600, for those who already own a fax-modem or fax machine.

The compact $399 Lumina faxes, scans, and copies to your printer. It connects to the parallel port on your PC, with a pass-through for your printer, and like a traffic cop, it routes all the jobs. But because the device controls your printer's only link to your PC, it may conflict with the status monitors that many personal printers use to say whether they're jammed or out of paper. In fact, we had to turn off the monitor on the Lexmark Optra E personal laser that we used with the Lumina.

That conflict aside, the Lumina worked like a charm. Its software was easy to work with; however, we had to switch out of it in order to use the bundled Eclipse Fax SE software for PC faxing.

THE LUMINA SERIES 2000 Model 2096 (left) and Panasonic KX-PS600 MFDs pick up where your existing machines leave off.

Panasonic's convenient $699 KX-PS600 printer, scanner, and copier detects when you slip a page into its feeder and asks if you want to scan or copy. Its useful software offers manual duplexing and image resizing. The device prints good 600-dpi images from Windows (only 300 dpi if you use its PCL driver for DOS applications).

The Panasonic does not fax, however; you need your own fax-modem to send faxes from your PC, and to send a hard-copy fax you must scan the image to disk and then import it into your fax software. Nevertheless, it's good to see a multifunction laser that costs significantly less than the Sharp F-2700M.

WHERE TO BUY

KX-PS600 $699; Panasonic; 800/742-8086

READER SERVICE NO. 773

Series 2000 Model 2096 $399; Lumina; 408/487-0400

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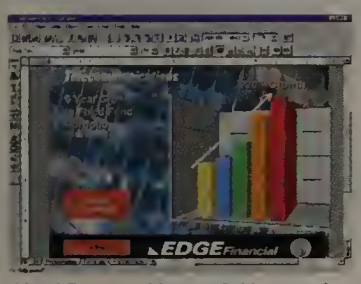

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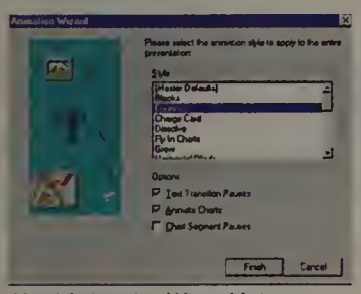

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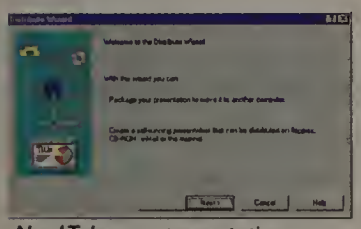

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MULTIFUNCTION DEVICES

STANDARD FEATURES

FEATURES	Canon MultiPass C2500	HP OfficeJet 350	JetFax 4	Ricoh MV74	Sharp F-2700M	Xerox Document WorkCenter 250 *
Street price (5/16/96)	$599	$599	$1195	$1100	$1061	$549
Width x depth x height (inches)	19 x 19 x 14	17 x 16 x 11	16 x 19 x 6	10 x 15 x 14	14 x 17 x 7	16 x 18 x 15
Weight (pounds)	17	20	20	16	15	23
Capacity for paper/transparencies/envelopes	150/50/20	100/20/20	100/20/1	150/20/0	100/10/1	100/1/1
PRINTER						
Printer type	color ink jet	monochrome ink jet	monochrome ink jet	color ink jet	monochrome laser	monochrome ink jet
Standard/maximum RAM	32K/32K	256K/256K	500K/2MB	64K/64K	256K/256K	512K/512K
Rated engine speed in black/color (ppm)	5/>1	3/–	2/–	4/1	4/–	3/–
Maximum resolution with standard RAM (dpi)	720 x 360	600 x 300	300 x 300	360 x 360	300 x 300	300 x 300
COPIER						
Makes multiple copies/collates	●/○	●/○	●/●	●/○	●/●	●/●
Enlarges/reduces	○/○	○/●	●/●	○/●	○/●	●/●
FAX AND SCANNER						
Optical resolution (dpi)	203 x 196	300 x 300	300 x 300	200 x 200	203 x 392	300 x 300
Fax-modem speed (kbps)	14.4	9.6	14.4	9.6	9.6	9.6
Scanner speed (seconds per page)	30	50	9	[1]	13	10
Black-and-white or gray-scale scanning	black and white	black and white	black and white	[1]	gray scale	gray scale [2]
Document feeder capacity (pages)	20	20	20	15	20	20
Saves incoming faxes in RAM/to disk	●/●	●/●	●/● [1]	●/○	●/○	●/●
Faxes from PC	●	●	● [1]	○	○	●
Telephone handset	○	○	● [1]	●	●	○
Number of pass-through telephony ports	2	1	2	1	1	1
COST OF CONSUMABLES [3]						
Price/page life of black ink or toner cartridge	$7.40/150	$26.95/1000	$54/1800	$32/900	$65/2000	$39/1400
Price/page life of each color ink cartridge	$21/100	–	–	$50/90	–	–
Price/page life of drum or printhead	$29/900	–	–	–	$90/20,000	–
SERVICE AND SUPPORT						
Warranty	2 years	1 year	1 year	90 days	3 months	1 year
Free phone support/toll-free number	●/●	●/○	●/●	●/●	○/○	●/●
Weekday/weekend phone support (hours)	16/16	16/7	11.5/○	10/○	○/○	12/4
Repair turnaround policy (days)	1	1	1	○	○	1
Fax-back service	●	●	○ [4]	○	○	○ [4]
Online support	BBS, CIS, WWW	AOL, BBS, CIS, WWW	BBS, WWW	WWW	WWW	CIS, WWW

* Best Buy ● Yes ○ No

[1] Extra-cost option. [2] Scans in gray scale but converts image to black and white. [3] Based on vendor specifications. [4] Under development.

PRINTING

2 Laser vs. Ink Jet, Black vs. Color If your multifunction device will work primarily as your printer, make print quality your top priority. The models we looked at were low-resolution 300-dpi or 360-dpi units and had acceptable print quality, but you may see 400-dpi and 600-dpi machines by the time you read this. You'll generally get better black text and line-art quality from laser- or LED-based models, such as the Sharp F-2700M we tested, but their prices tend to be higher. Color ink jets, such as the Canon MultiPass C2500 and the Ricoh MV74, can print brighter and more-creative output as well as good text. Over time, however, the ink cartridges and special papers for any ink jet will cost more than laser or LED consumables.

FAXING

3 Faxing Basics vs. Power Options All the MFDs we review offer basic faxing capabilities, such as speed dialing, group faxing, and deferring transmission to save on phone charges. The Ricoh offers more options—you can poll for expected faxes and use Caller ID to refuse faxes from specified or unrecognized numbers. The JetFax is the fastest we tested. However, the Ricoh and the JetFax require extra-cost software or hardware to fax from your PC (our JetFax unit included the add-on), and the Sharp F-2700M can't do it at all. If you plan to use your MFD as your fax-modem for PC faxing as well as hard-copy faxing, make sure it works both ways.

SCANNING

4 The Scanner Affects Faxing and Copying The quality of the scanner on a multifunction device largely determines the quality of your faxes and copies, as well as OCR accuracy. Look for the highest-resolution scanner you can find, such as HP's 300-dpi model.

Most of the MFDs we tested scan in black and white only; they're best for text

scanning. If you need gray-scale scanning—to import graphics for your Web page, for example—basic 24-bit flatbed scanners are available now for about $500. A flatbed scanner can also scan pages from bound documents such as reports and books. Our baseline Logitech PageScan Color scanner can detach from its base to scan bound pages, but the MFDs process only loose pages.

COPYING

5 Don't Expect Much All the MFDs we looked at can copy, but the copies come out slowly and look fuzzy. What matters more is versatility—whether the machine can produce multiple copies (all the ones we tested can), collate them, and change the size of the image. Only the JetFax and the Xerox can do all of these.

SOFTWARE

6 Software Utilities Make the Difference The ability to control a multifunction device via a software utility from your PC can make your life easier. This capability is hard to determine until you use a machine, but we detect a trend: The devices from big printer vendors tend to have better software. The HP and Xerox are the easiest to use; the Canon runs a close second. The JetFax, Ricoh, and Sharp have no central software utility. All three direct you to their front control panels for many functions, but the Sharp and Ricoh are more difficult to use.

EXTRAS

7 Bundled Software Bargains Some of the multifunctions we tested come with faxing or OCR software that add value and convenience—if you need their features. But more often than not you'll get "lite" versions, with fewer capabilities. The JetFax 4's Connectivity Package includes complete, current versions of Caere's PageKeeper 2.0 document management program and Delrina's WinFax 3.0 for PC faxing. The Xerox Document WorkCenter comes with the company's own OCR program, TextBridge Professional, but its fax software is merely Delrina WinFax 4.0 Lite. The HP OfficeJet 350's Caere OmniPage 4.0 Limited Edition OCR software and Eclipse Fax SE for PC faxing are both "lite" versions.

A PORT SHORT

8 Plan for Peripherals Expecting a crowd? Your typical PC has one parallel port and two serial ports. All the multifunctions we tested need to use the parallel port, and the HP and Xerox also need a serial port (as do the Ricoh and Sharp if you buy optional features). If you already have a printer on your parallel port, or a serial mouse and modem, you could be out of room. All the units we tested have pass-through ports for phone lines and can route voice calls to an answering machine or phone. But none can act as a data modem. So if your external data modem is suddenly portless, you may have to buy an internal modem to free a serial port, or an I/O expansion card to add ports.

BILLING

9 Reporting and Administration If you plan to share your MFD or use it for billable work, you'll want to assign user codes to each user, billing codes to your clients, and tax codes to projects. But none of the MFDs can make electronic files of reports. The Xerox offers a little more than the rest, while the Ricoh offers the least, but none of these machines are adequate for billing and tracking.

TROUBLESHOOTING

10 When All Else Fails... As the saying goes, read the manual. And if that fails, call the company's tech support. Again, the printer vendors earn top marks: Xerox, Hewlett-Packard, and Canon provide good manuals and generally good technical support. Sharp's manual for the F-2700M is just about useless, and Sharp makes you go to your dealer for support. None of the Web sites provide access to tech support staff or any useful troubleshooting information.

Most of the vendors promise 24-hour repair turnaround or exchange for failed devices. Sharp and Ricoh leave it to the dealer's discretion.

For more information about all products in this article, circle reader service no. 913.

Dan Littman has covered printers, fax software, modems, and other computer technologies for ten years. Testing performed by Dave Casini of the PC World Test Center.

REVIEWS

CANON MULTIPASS C2500

PROS: Good output quality, 14.4-kbps fax-modem, two-year warranty is longest of the bunch

CONS: Slowest MFD we tested, front control panel is difficult to use, no bundled software

PURELY AS A PRINTER, Canon's MultiPass C2500 is a class act, but as a multifunction device, it's very slow and somewhat difficult to use.

This boxy $599 machine is a good choice in many ways: It costs just $50 more than our Best Buy while offering such features as color ink jet printing and a faster 14.4-kbps fax-modem. It also has the longest warranty (two years) of any unit reviewed.

Canon MultiPass C2500

Canon's software offers a wealth of features for producing the best output on paper or special media, including film or fabric. Printers often have a hard time making both gray-scale and black text look good on the same page, but the Canon has a setting that juggles them ably. Another option lets you control the color intensity. The Canon equals or surpasses the Xerox in printing, faxing, and copying quality, and most functions are easy to use from its well-designed software utility.

However, if you choose this color ink jet over our Best Buy, prepare for frustration: Overall, it's the slowest unit we tested. While most of the MFDs we review here favor basic text and fall short when processing graphics, the Canon is the opposite. Its 200-dpi scanner made the best graphics scans, but it also produced some of the worst text scans, a more common application for this level of machine.

The MultiPass's control panel is hard to use. For example, to resend a fax after a second error, you hit the "memory reference" key on the Canon's 16-key control panel and skip past the "delete document" command to "man. retransmit" [sic]—a sequence you're unlikely to grasp without the manual. These flaws detract from the Canon's better attributes. Canon Computer Systems, 800/848-4123.

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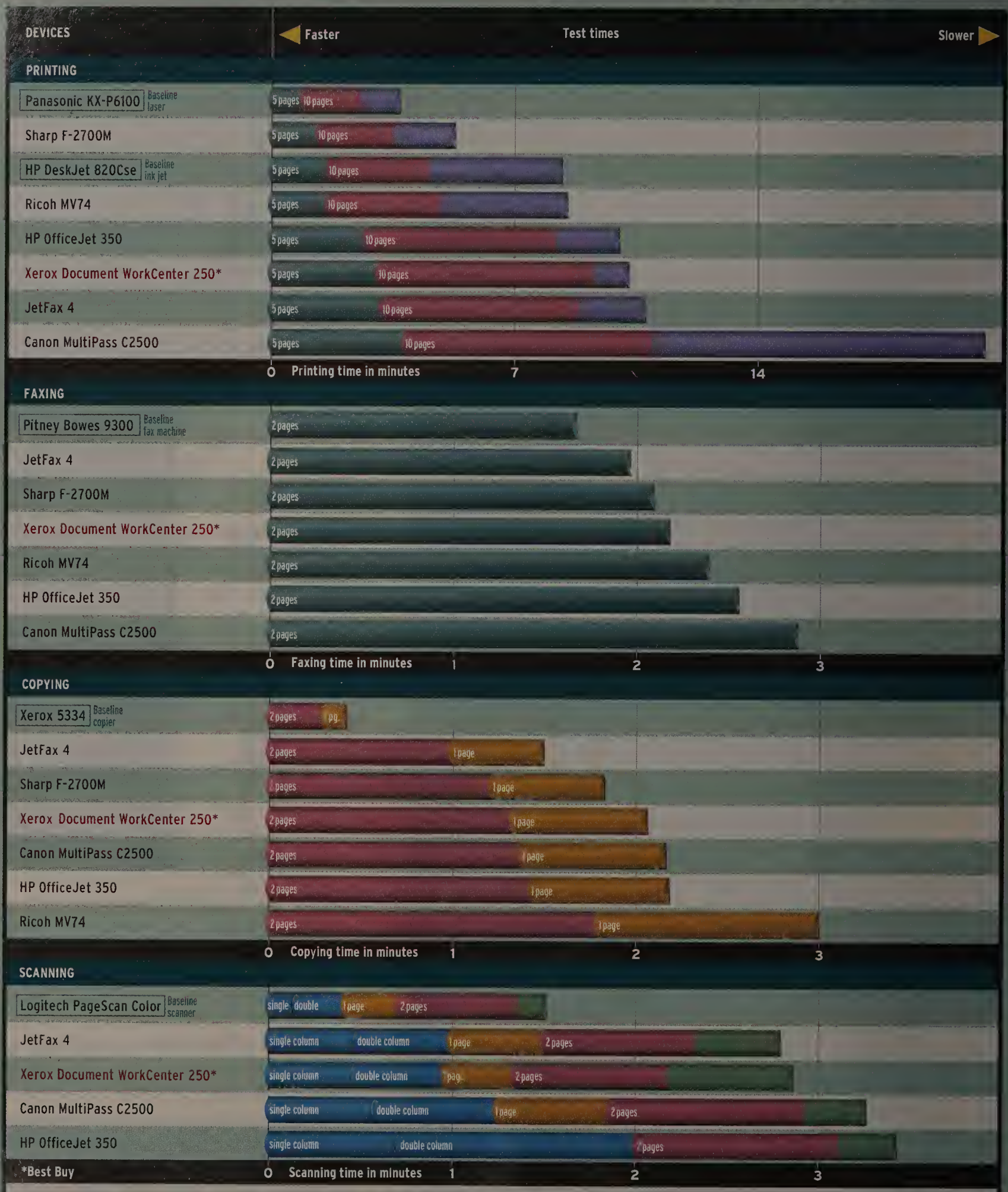

Spreadsheet

Text document

Mixed graphics

Magazine article

Newspaper clipping

Color photograph

Devices are arranged in order of total testing time from best to worst. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

HOW WE TEST Each device, its drivers, and bundled software were installed according to the vendor's instructions. For the Ricoh MV-74, we used the Ricoh Windows 3.1–based driver instead of a competing driver recommended by the vendor because the Ricoh driver yielded dramatically faster results. All tests used a Micron P90 Millennia with 16MB of RAM as the PC; the test bed was set up with Windows 95 in its default configuration. Devices that did not perform a function were omitted from that test. For comparison, we also tested stand-alone machines for each function. We printed, faxed, copied, and scanned a variety of documents on each device. Timing began when we initiated the function's command, and ended when the output was completed.

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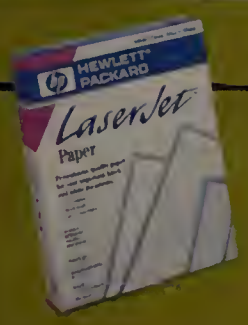

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HP OFFICEJET 350

PROS: One of the easiest-to-use software utilities we tested, good output quality

CONS: Flimsy design, fax software not integrated with rest of software, noisy

THE $599 HP OFFICEJET 350 is a good example of how a PC and a smart multifunction device can become more than the sum of their parts. The HP isn't perfect: It's somewhat slow, and it has some annoying, though not fatal, design flaws. Nevertheless, the OfficeJet has good print quality and is easy to use, thanks to its software.

HP OfficeJet 350

The OfficeJet's monochrome ink jet produced crisp prints, faxes, and copies. It scanned text well, but scanned photos looked awful.

The HP device's software utility is the most alert of the bunch. For example, it sensed when we slipped a document into its feeder, and its utility then asked if we wanted to fax, copy, or scan—automatically bringing us a step closer to executing a task. The other units we tested wait for you to tell them what to do.

We were surprised, though, that faxing isn't integrated with the other functions. Instead, the OfficeJet bundles Eclipse Fax SE, a third-party fax utility. Eclipse has some nice features: It can superimpose a Post-it–like note on an outgoing fax from your PC, or send a cover page from your PC along with a paper fax. But you must switch out of OfficeJet's main control software to use Eclipse Fax SE, an inconvenient step.

HP cut a few corners in the OfficeJet's hardware design, as well as with its software. A flap for holding legal-size paper not only feels flimsy, it sticks out from the machine's profile, inviting breakage. Faxed or copied originals fall onto a flimsy wire loop that looks like a recycled shirt hanger. A spring-loaded guide flap on one side of the input paper tray tends to push sheets out of alignment. And the parallel port is on the machine's belly—a location that is both unusual and hazardous (the OfficeJet nearly fell off the desk as we tipped it on edge to install the cable).

Although the HP OfficeJet 350's print quality and software are among the best we've seen from these multifunctions, we expected a better overall design. Hewlett-Packard, 800/752-0900.

READER SERVICE NO. 776

JetFax 4

JETFAX 4

PROS: Fast; comes with PageKeeper 2.0 OCR and document-archiving software and Delrina WinFax 3.0

CONS: Expensive, JetFax driver is outdated

WHILE THE JETFAX has some good points, it misses on the finer details. The sleek, low-slung multifunction did well on our speed tests. It closely resembles the Xerox on the inside and has acceptable output quality, but its street price—$1195 with the PC faxing option—is too high.

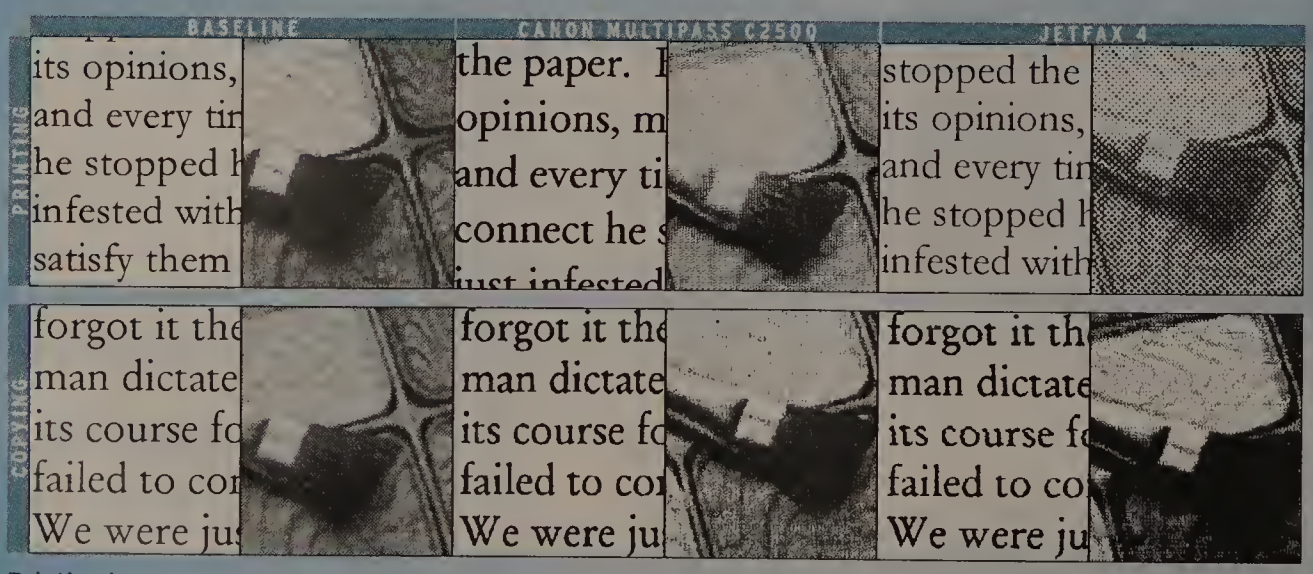
We tested this machine with the Connectivity Package option, which adds a serial port so the JetFax 4 can scan to and fax from your PC. This option tacks $200 onto the standard version's $995 street price. The Connectivity Package includes a complete, current version of Caere's PageKeeper 2.0, a combination OCR and document-archiving package. PageKeeper stores the text of a scanned document and an image of the document in a database, instead of dumping the raw text into an anonymous file as most OCR software packages do. Unfortunately, PageKeeper's OCR did poorly in our tests. This could be due as much to the JetFax's poor scan quality, however, as to the software itself; its faxes, also dependent on the scanner, were pretty bad, too.

Envelope printing on the JetFax 4 is tedious: You must load envelopes one at a time in a special inserter that slips into the device, press Form Feed on the printer, and then go to your computer to send the print job. The Canon and HP systems, by contrast, can chomp through a stack of envelopes with little intervention.

JetFax missed the boat on software. It lacks a central utility, its print driver dates back to Windows 3.0, and JetFax doesn't even ship it with the unit. JetFax recommends using an HP ▶

PRINT QUALITY SAMPLES

Multifunctions Print Well, Copy Worse



Printing is one thing, but copying is another. Both the Canon MultiPass C2500, which receives high ratings for overall output quality, and the JetFax 4, which rates poorly, delivered adequate or better print quality compared to the baseline HP DeskJet 820Cse.

We were disappointed by the image degradation we observed in photocopies, however. Compared to the original laser-printed page, neither the Canon nor the JetFax made better than a fuzzy approximation.

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by Dan Krewson
SOC 101
Prof. Schoen
June 29, 1996

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DeskJet driver, as we did for testing; but for the unit's steep price, we'd prefer everything up to date and well integrated. JetFax, 800/753-8329, 415/324-0600.

READER SERVICE NO. 777

RICOH MV74

PROS: Offers the most fax features

CONS: Expensive, complicated setup, bad documentation, no central management utility, doesn't print envelopes, doesn't scan

RICOH'S MV74 is more of a fax machine than anything else. It's one of the few that comes with a telephone handset, and it had the best set of faxing features we tested, but its arcane control panel makes using it an ordeal. Also, you have to choose between its outdated printer driver or a third-party driver that causes it to print slowly. Considering its high street price of $1100, we expected more.

The Ricoh's one advantage is its long list of fax features. The Ricoh can be programmed to refuse faxes from either specified or unknown senders, and its Page Retransmission feature can recover lost pages.

Ricoh MV74

If only the machine were easier to use. With no central software utility to help you, changing the MV74's settings is a painful process that involves entering incomprehensible strings of numbers from lists in the manual.

Printing with the MV74 to print was more confusing than with any other multifunction we tested. The Ricoh comes with its own Windows 3.1–based driver, but for printing under Windows 95, the company recommends using Canon's driver for the BJC-4100 color ink jet printer. We tried both. Using the Canon driver helped us avoid a few annoying but harmless glitches in the Ricoh driver. However, it also made the MV74 print more slowly and deprived us of some of the Ricoh driver's useful features. And finally, the Ricoh we tested can't scan to disk. New software and a $209 daughterboard that add this capability should be available by the time you read this. Ricoh, 800/637-4264, 201/882-2000.

READER SERVICE NO. 778

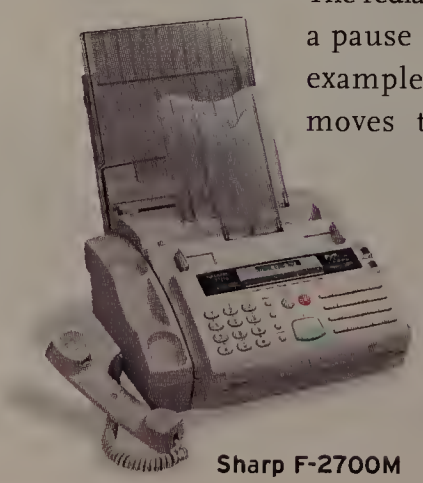
SHARP F-2700M

PROS: Great laser print quality, fast, quiet, includes telephone handset

CONS: Expensive, no PC faxing or scanning, control panel can be confusing

LIKE THE RICOH, THE Sharp F-2700M feels like a fax machine doing double-duty as a printer—and not very well. The Sharp's $1061 street price, with no bundled software to sweeten the deal, also makes it expensive. But its laser printer engine, the only one we tested, performed at or near the top on our speed tests. Its output quality is blacker and cleaner than any ink jet–based competitor's, coming close to the quality of our Panasonic KX-P6100 baseline laser.

Sharp's multifunction has little else to recommend it, however. It can store only one outgoing fax in memory, while the Xerox WorkCenter 250 can hold a document in each of its ten mailboxes. It also lacks a PC-based address book like those provided by Canon, Xerox, and HP; you have to enter names into the speed dialer using the numeric keypad, which is a pain. To add the name Littman, one has to press the 5 key four times just to enter the L—it first displays 5, then J, then K, and finally L. One must repeat this process for each letter. Other functions on the control panel are similarly confusing. The redial button is also used to insert a pause in a dialing sequence, for example, and the speaker button moves the cursor to the right.



Sharp F-2700M

Although the Sharp F-2700M is one of the few laser-based MFDs available, you deserve more for your money. Sharp Electronics, 800/237-4277, 201/529-8948.

READER SERVICE NO. 779

XEROX DOCUMENT WORKCENTER 250

PROS: Excellent software-based and front-panel controls, least expensive model reviewed

CONS: No output tray for faxes and printouts, can't receive a fax while scanning

XEROX'S $549 DOCUMENT Work Center 250 garners Best Buy honors for a couple of important reasons: It's full of useful features, and it's easy to use. While its monochrome ink jet's output quality is simply adequate, it earned decent speed scores, and its design is better executed than the HP's. On top of all that, it's also the least expensive multifunction we tested.

Xerox Document WorkCenter 250

The Xerox's seamless relationship with your PC is sure to please. If you change some settings in your PC's address book, for example, the new settings are sent to the MFD and function even when the PC is not on, and vice versa. And compared to the inscrutable front-panel controls seen on other MFDs in this review, those on the Xerox are refreshingly easy to understand: The OK button accepts a changed menu command, and the Exit button backs out of a menu.

The WorkCenter 250 also has some of the best fax features. For example, you can send a broadcast fax to a combination of individual and group addresses; of the units we tested, only the HP shares this trait. You can set the WorkCenter to require account codes for outgoing faxes and create password-protected mailboxes to receive faxes. It can't receive a fax while scanning, however, and it has no output tray to catch faxed or scanned originals.

Output quality and speed on the Xerox are average overall. Its prints, faxes, copies, and scans looked acceptable. We liked the deep blackness of its ink, and it printed great-looking transparencies, but printed text on paper was a little grainy. It consistently placed at or near the middle of the pack on all our performance tests.

In a category riddled with compromises, the Xerox Document WorkCenter 250 comes closest to our ideal of the do-it-all-easily multifunction. Xerox Desktop Document Systems, 800/832-6979.

READER SERVICE NO. 780 ■

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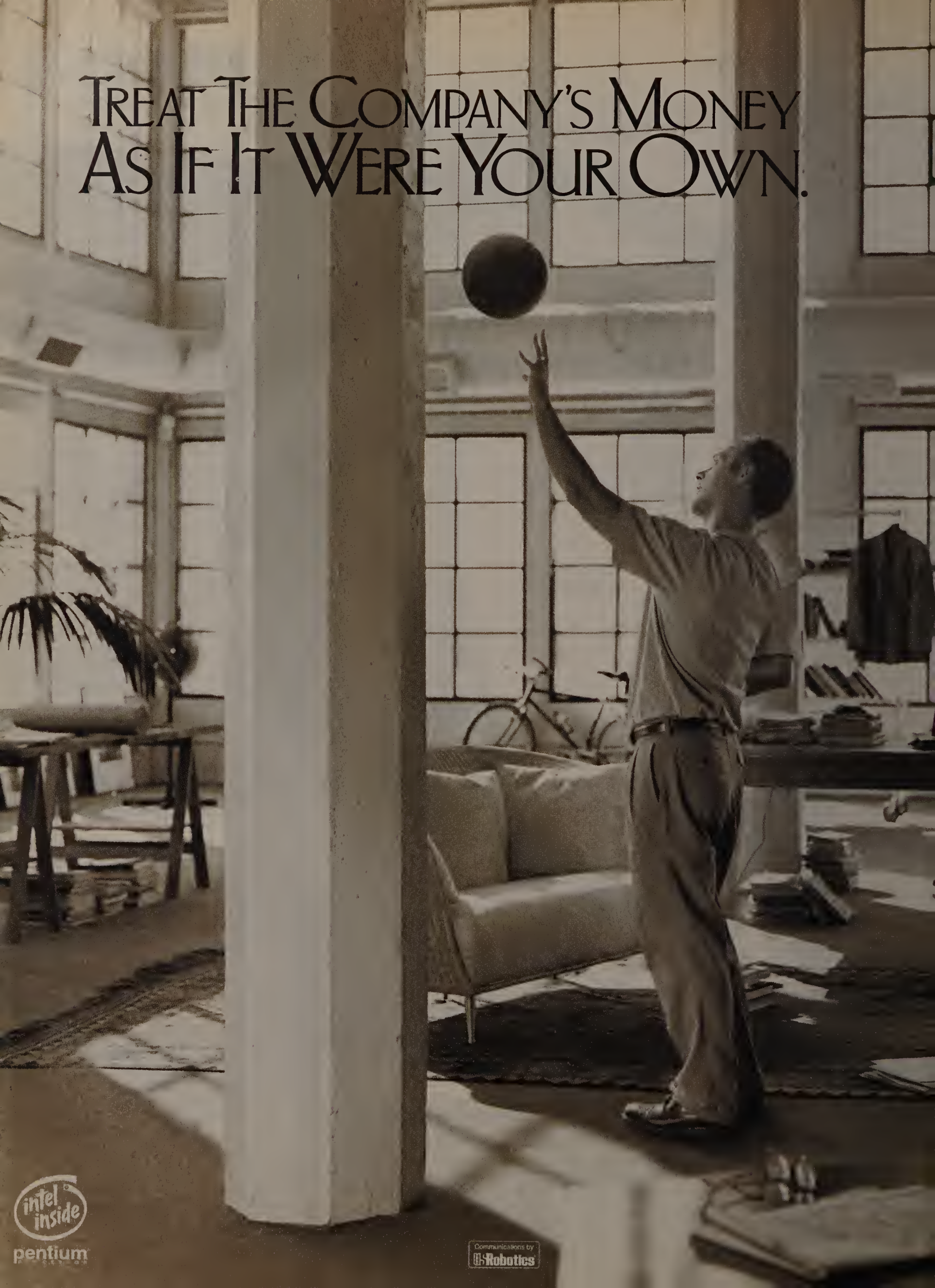

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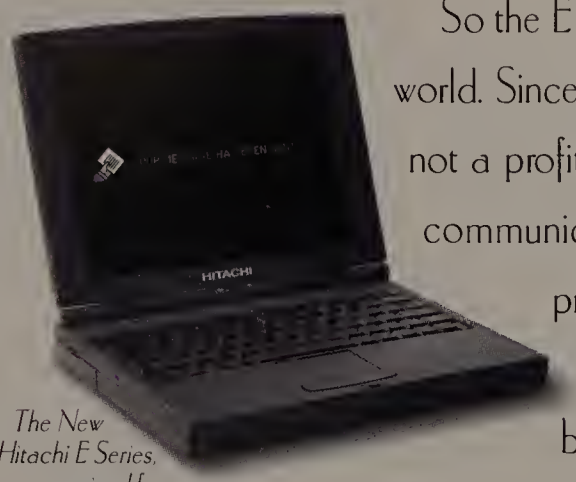

The New Hitachi E Series, conceived for communications.

So the E Series arrives wired for the world. Since fussing with computers is not a profitable use of your time, its communications software comes pre-configured. And its 28.8 U.S. Robotics modem, being an industry standard, connects you glitch-free from anywhere to anywhere via the Net, online services, or two-way fax.

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In short, the Hitachi E Series has been honed for communications. The first thing it communicates is a healthy regard for your money.

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DO IT ALL!

From automating mass mailings to creating Web pages, here's how to get the most from Microsoft Office, Lotus SmartSuite, and Corel WordPerfect Suite.

Tips for Mastering Your Office Suite

A GOOD SUITE is like a well-rehearsed string quartet: The word processor starts off with a gentle prelude, the spreadsheet joins in for the first movement, and finally all these seemingly independent programs build to a crescendo.

Alas, today's suites are still in need of practice; even accomplished applications insist on finding their own tempos and keys.

The examples in this article, designed for a fictitious gourmet food company we're calling Starducks, will help you transform your collection of soloists into a world-class ensemble.

WHETHER YOU'RE using the Windows 3.*x* or Windows 95 version of Microsoft Office, Lotus SmartSuite, or Corel WordPerfect Suite, you'll learn to make all the pieces work in perfect harmony. You'll link a worksheet chart to a word processing document, turn that document into a presentation, create a professional-looking Web site, and merge a cover letter with a mailing list from your spreadsheet or database. You'll also learn to make applications cooperate when they're not part of the same package. Because a well-tuned suite is music to your ears. ▶

BY GEORGE CAMPBELL

ILLUSTRATION: PETER HOEY

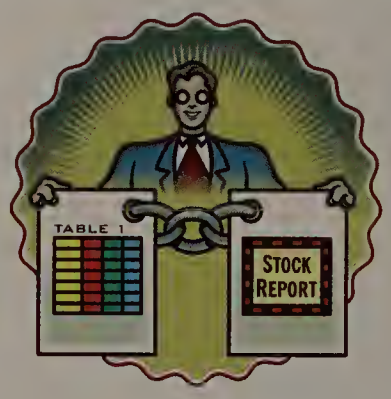
JOB #1

Link a Worksheet to a Document

YOU'RE CREATING the annual stockholders report in your word processor. The pages are laid out beautifully, you've found just the right font, and your prose is witty and upbeat. But you need something else: the FY96 Market Share chart from the Budget worksheet, inserted right into the middle of your text. You could simply cut and paste the information from one program to another, but then your document will be out-of-date the next time someone changes the worksheet.

The trick is to link your worksheet to your document. A link is like a window into your word processing file created by another program. Here's how to do it in each of the office suites.

MICROSOFT OFFICE (BOTH VERSIONS)



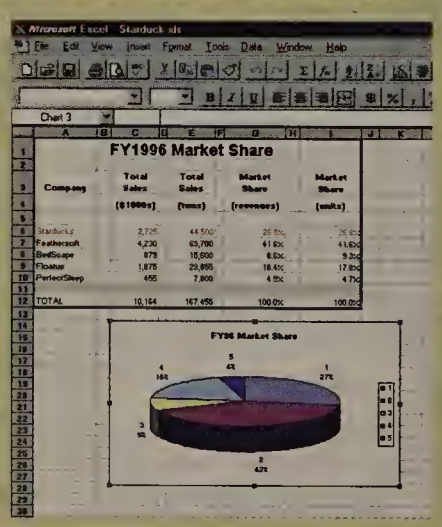
1. BECAUSE CELL ADDRESSES can change, you should name the Excel range that you want your Word document to display. Open the worksheet and highlight that range. Select *Insert•Name•Define,* enter a name like **ToWord**, and press **<Enter>**.

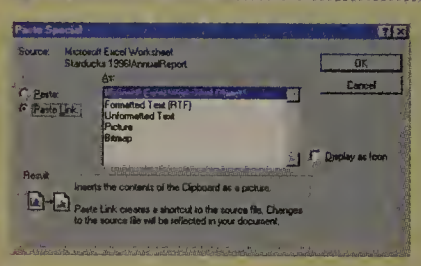
2. Select *Edit•Copy.*

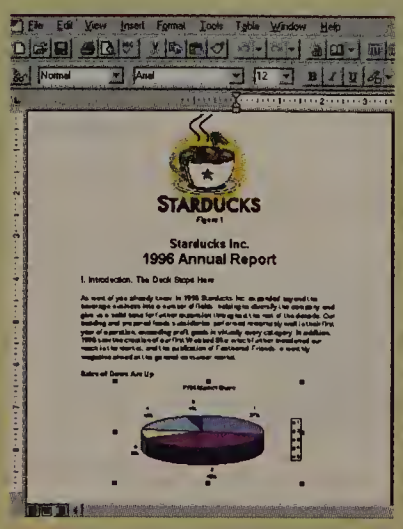
3. Enter Word and open your document. Place the cursor where you want the view of your worksheet to appear.

4. Select *Edit•Paste Special.*

5. In the resulting dialog box, click the *Paste Link* option, and in the As list, choose *Microsoft Excel Worksheet Object* to insert a graphic object, or *Formatted Text (RTF)* to create a Word table containing the data. Click *OK* to complete the link. The Worksheet Object will look like a piece of your spreadsheet stuck in a resizable box inside your document, while the Formatted Text will look like (and actually become) a part of the document itself.







PASTE FOR SUCCESS. The key to successful linking between different apps (whether they're part of the same suite or not) is using the Paste Special option, which is found in the Edit menu of all Windows apps.

LOTUS SMARTSUITE (BOTH VERSIONS)

1. BECAUSE CELL ADDRESSES can change, you should name the 1-2-3 range that you want your Word Pro document to display. Open the worksheet and highlight the range. Select *Insert•Name•Define,* enter a name like **ToWordPro**, and press **<Enter>**.

2. With the cells still highlighted, select *Edit•Copy.*

3. Open Word Pro and load your document. Bring the cursor to the spot where you want the worksheet data to appear.

4. Select *Edit•Paste Special.*

5. In the resulting dialog box, click the *Paste link to source* option. In the As list, choose *1-2-3 Worksheet Object* to insert a graphical image of the data, or *Rich Text Format* to create a Word Pro table containing the data, then click *OK.* The 1-2-3 Worksheet Object will look like a piece of your spreadsheet stuck in the middle of your document, while the Rich Text Format will look like part of the document.

COREL WORDPERFECT SUITE AND NOVELL PERFECTOFFICE (ALL VERSIONS)

1. BECAUSE CELL ADDRESSES can change, you should name the Quattro Pro range that you want your WordPerfect document to display. Open the Quattro worksheet and highlight the range in question. Select *Insert•Name•Define,* enter a name like **ToWP**, and press **<Enter>**.

2. With the range still highlighted, select *Edit•Copy.*

3. Open WordPerfect and load your document. Bring the cursor to the spot where you want the worksheet data to appear.

4. Select *Edit•Paste Special.*

5. In the resulting dialog box, click the *Paste Link* option. In the As list, choose *Quattro Pro Notebook* to insert a graphical image of the data, or *Rich Text Format* to create a standard WordPerfect table containing the data. Click *OK* to finish the job. Quattro Pro Notebook format will look like a piece of your spreadsheet stuck in the middle of your document; Rich Text Format will look like part of the document.

JOB #2

Create a Presentation From a Document

NOW THAT YOU'VE CREATED your report, you have to present it at the stockholders meeting. And since no one wants to spend half an hour watching you talk, you must turn the main points of your presentation into a slide show. The right tools for that job are your word processor's outliner (for extracting the main points from your document) and your suite's presentation program. Unfortunately, these tools aren't always on speaking terms. Here's how to get them to cooperate.

MICROSOFT OFFICE (BOTH VERSIONS)

TO HELP WITH YOUR LEARNING CURVE, Microsoft PowerPoint can read Word files, helping you turn them into effective presentations in just a few steps. The trick is to set up your document using Word's outline-based heading styles (Heading 1, Heading 2, and so forth).

If your document isn't already using these styles, load it into Word and select *View•Outline*. Scroll through your document, using **<Tab>** and **<Shift>-<Tab>** to assign outline levels to the paragraphs you consider important enough to include in your slides. When you're satisfied with the outline, close and save your file.

When your document is ready—but isn't open in Word—enter PowerPoint. Ignore any wizards that pop up to help you create a document; you don't need them.

Select *File•Open*. In the resulting dialog box's Files of Type list, select *Outlines* (in Office 7.0, it's *All Outlines*). Choose the document you want to convert, then click *OK*.

PowerPoint will create a new file from your document and switch to Outline View. All paragraphs in the Heading 1 style will become individual slides. Subheadings will fall into place naturally, typically appearing as bulleted lists. Paragraphs that weren't styled as outline headings in Word won't appear at all.

Unfortunately, PowerPoint won't bring in any pictures, worksheet tables, and other objects from your Word document. You will have to go through your document and copy these items over one by one, using *Edit•Copy* in Word and *Edit•Paste* in PowerPoint.

To view your presentation in a more graphical way, select *View•Slide Sorter*. Use the various options in the Format menu to select a layout, a color scheme, and other elements to give the presentation the look you want. To edit an individual slide, double-click it.

LOTUS SMARTSUITE (BOTH VERSIONS)

IF SMARTSUITE 4.0 were a string quartet, Word Pro and Freelance Graphics would insist on playing in different rooms. There's simply no way to import text from one to the other except by copying and pasting through Windows' Clipboard—and even then you lose a lot of information. SmartSuite 96 rectifies the situation with a Word Pro macro.

The first part of the process is identical for both versions: In order to get rid of the bulk of your text and bring only your document's headers into the slide show, you'll need to create a table of contents. With your document open in Word Pro, select *Create•Other Document Part•Table of Contents*. This brings up an assistant that walks you through the process.

Once you've created your table of contents, click the *TOC* tab to display it. Click and drag the mouse over the table to highlight just the left side of the document, which contains the text but ▶

Never Mind the SUITES: Everybody Shares

ALMOST EVERY WINDOWS APPLICATION can share data with almost every other Windows application, even if they're from competing vendors. You can use the Clipboard to cut, copy, and paste data between applications, or you can use Object Linking and Embedding to seamlessly mix data types in a single file.

Using OLE isn't difficult, but the concepts aren't always clear. Why is it better than copying and pasting? What's the difference between linking and embedding? Here are some answers.

CAN'T I JUST CUT AND PASTE?

Cutting or copying and pasting between apps is the simplest method of copying data. The problem is that pasted data loses any connection to the program it was created in.

For example, you could copy a spreadsheet range with Edit•Copy, then paste it into a word processor with Edit•Paste. But the result would be a word processing table—you'd have a hard time setting up formulas and charting the results. And when the original worksheet changes, your word processor will never know.

WHAT IS LINKING?

When you link, say, a worksheet to a memo, you're establishing a live line between the two apps. The document displays the worksheet and has to keep updating the data based on the source.

WHAT IS EMBEDDING?

When you embed a worksheet into a document, you're effectively putting one type of file completely inside another. There's no connection between the two files; in fact, there doesn't have to be a separate worksheet file. You've got a worksheet, with all the properties of a worksheet, inside a document.

SHOULD I LINK OR EMBED?

It depends. Using the worksheet-in-document example, if you need access to the worksheet, link it. But if the worksheet has no other purpose than to be part of the document, you'll want to embed it. And when you send documents to other people, *definitely* embed it, since links tend to break as they go from system to system.

HOW DO I LINK FILES?

See "Job #1: Link a Worksheet to a Document."

HOW DO I EMBED AN EXISTING FILE?

Again, follow the instructions in "Job #1: Link a Worksheet to a Document" in the main section of this article. But this time, in the Paste Special dialog box, select *Paste* instead of Paste Link.

HOW DO I CREATE NEW EMBEDDED OBJECTS?

Open the application you want to embed the object into, and select *Insert•Object* or your app's equivalent command. Select the application you want to create the object in and click *OK*. That's it. You'll be in your second application, ready to create.

HOW DO I EDIT OBJECTS?

To make changes in an object, double-click it. Make your changes, then return to your document by selecting *File•Exit and Return*.

—*George Campbell*

not the page numbers. Select *Edit•Copy*.

From here on, everything depends on your version of SmartSuite.

SmartSuite 4.0: Open Freelance and select *File•New*. In your new document, select *View•Outliner*, then *Edit•Paste* to insert your document's table of contents. You'll lose the TOC's hierarchy, so you'll have to tell Freelance which headings start a new slide, which are bulleted points, and so on. Press **<Tab>** or **<Alt>-<Tab>** to assign levels of importance to the headings. To preview your presentation, select *View•Slide Sorter*.

SmartSuite 96: Select *File•New* to create a Word Pro document. Select *Edit•Paste* to insert the TOC, then *Text•Select•Entire Division* to highlight the document.

Next, select *Edit•Script and Macros•Run*. In the resulting dialog box, select *Run script saved in another file*, then click *Browse*. For your type of file, select *ASCII Script Files (*.LSS)*, and for the file itself, choose *prsit.lss*. Click *Open*, then *OK* to run the script. The script will create a simple slide show based on your TOC.

COREL WORDPERFECT SUITE AND NOVELL PERFECTOFFICE (ALL VERSIONS)

AS WITH SMARTSUITE 4.0, the only way to shuffle text between this suite's word processor and its presentation program is to copy and paste. Fortunately, Presentations maintains the hierarchy of a pasted WordPerfect outline. Here's how to go about it:

1. Create your document in WordPerfect's outline mode (select *Tools•Outline*).

2. When your document is ready, click *Hide Body Text* so you get only the outline.

TOP 10 Tasks You DON'T Want to Perform With Your Suite

10: Install it onto a hard drive that already contains 875 fonts and the complete works of the Microsoft Legal Department.

9: Let your children embed the graphics of their choice into your annual report.

8: Link your bankruptcy worksheet to the letter for a loan application.

7: Figure out which program brings down Windows 95 when you have them all up at once and sneeze.

6: Try to actually use your word processor as a Web browser.

5: Include your résumé in a presentation given before the executive steering committee.

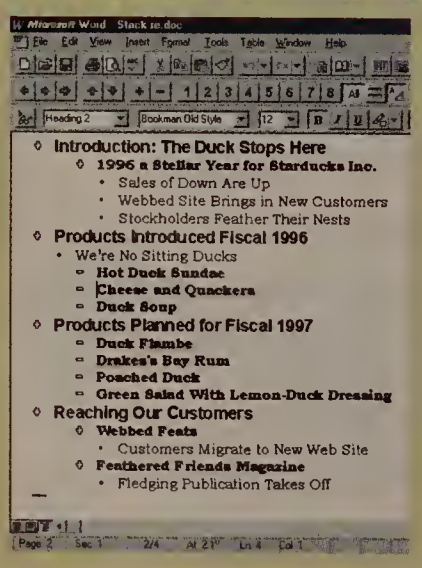
4: Collaborate with someone whose idea of a good user interface is the DOS prompt.

3: Let your adolescents embed the graphics of their choice into your annual report.

2: One word: *uninstall.*

1: Balance the federal budget.

—Lincoln Spector



FROM WORD TO POWERPOINT: You can open a Word document as an outline in PowerPoint, and it will automatically turn into a slide presentation.

3. Highlight the outline by selecting *Edit•Select•All*, then select *Edit•Copy*.

4. In Presentations, choose *Create a New Slide Show*, click *OK*, then follow the steps in the New Slide Show dialog box to select a style for your presentation.

5. Once in your empty presentation, select *View•Outliner*.

6. Select *Edit•Paste* to transfer your WordPerfect document's outline to Presentations. Each level 1 topic in the outline will become a slide, with the lower-level topics appearing on that slide, typically as bulleted lists. Select *View•Slide Sorter* for a more graphical view.

JOB #3

Create Web Pages

YOU MIGHT WANT to make your report available electronically to stockholders and employees. A secure Web site on the Internet or an intranet is the ticket for a quick display on almost any kind of computer.

This means translating your document or slide presentation into the Hypertext Markup Language that all Web browsers understand. Luckily, all word processors and most presentation programs can handle this, either by themselves or with a free add-on.

MICROSOFT OFFICE 4.3

WORD 3.*x* FOR WINDOWS requires a free add-on in order to create Web pages. You can download the Word Internet Assistant as wordia.exe from Microsoft's Web site (http://www.microsoft.com) or PC World Online. Save the file into a temporary directory, then double-click it to extract the files inside. Double-click the setup.exe file to install the Assistant.

Once you've installed the program, creating a Web page is as easy as opening your document, selecting *File•Save As*, and saving the file in the *Hypertext Markup Language (HTML)* format. Word correctly converts most document formatting—within HTML's limitations. It also converts tables, bulleted text, and so on. It can't convert embedded graphics or any OLE objects, so you'll have to save these separately as JPEGs or GIFs (the two graphics formats that browsers understand) and insert them into your HTML file later.

Once you've converted the document, you can add formatting, hyperlinks, and other Web features via the Assistant's toolbar, which appears automatically after you've saved an HTML file.

The Windows 3.*x* version of PowerPoint offers no translation into HTML. ▶

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*Estimated retail price in the U.S. Actual price may vary. System Requirements: For Windows 3.1: 8 MB RAM, 386 DX/25 MHz or higher; For Windows 95: 8 MB RAM, 486/33 MHz or higher; 8 MB (default size); 30 MB free disk space. **Available in U.S. and Canada only. ©1996 Okidata Reg. T.M., M.D. Oki Electric Industry Co., Ltd. They're your ideas. We just help. T.M. [illegible] PostScript T.M. Adobe Systems, Inc. Windows Reg. T.M. Microsoft Corp.

MICROSOFT OFFICE 95

THERE ARE INTERNET Assistants for almost all Office 95 applications; they're available from Microsoft's Web site (http://www.microsoft.com) and from PC World Online. Note that you may not have to download the Internet Assistant for Word 7.0—it's been included in the Office CD-ROM since last spring. If you don't have it, download wrdia20z.exe into a temporary directory on your hard disk, and double-click it to launch the Setup program. It'll add the HTML option to your *File•Save* menu.

Turning a Word document into a Web page is simple: Select *File•Save As* and save your document as *HTML Document*. Word will convert graphics, OLE objects, tables, and styles into an appropriate format for Web documents. You'll also get a toolbar for adding links and other HTML features.

Converting from PowerPoint is equally easy. Its Internet Assistant converts a presentation into a series of Web pages, turning each slide into a graphical image on its own page. Download pptia.exe, and execute it in a temporary directory. With your presentation loaded, select *File•Export as HTML*.

LOTUS SMARTSUITE (BOTH VERSIONS)

BOTH VERSIONS OF WORD PRO can save HTML files. Simply select *File•Save As* and use the file type *HTML*. Word Pro does a good job of converting most formatting and inserted objects, turning graphics into .jpg files and adding links to them in the document.

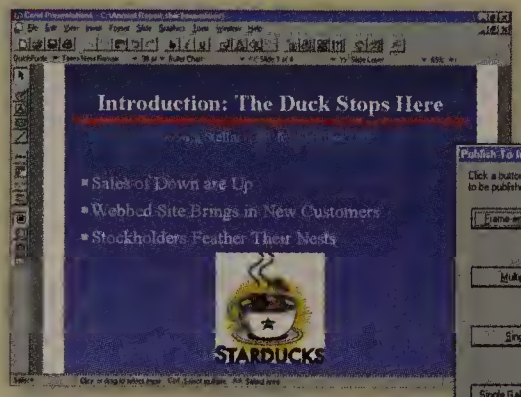
With SmartSuite 96 you can just as easily turn a Freelance presentation into a connected series of sites (alas, SmartSuite 4.0 doesn't know this trick). Simply select *File•Publish to Internet* and name and save the file.

To call up a dialog box to help you format the page, click *Options*. Consider the *A table of contents with a link to each page* option in the resulting dialog box; it will be an immense help to readers of your presentation. Click *Save* to finish the job.

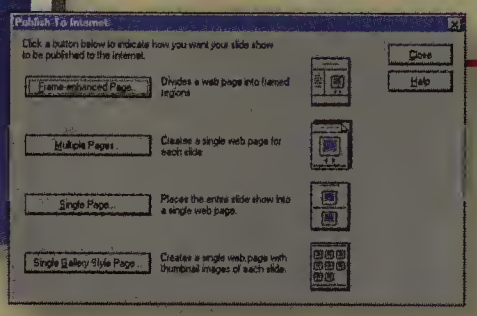
COREL WORDPERFECT SUITE 6.0 AND NOVELL PERFECTOFFICE 3.0

WHEN IT COMES to speaking HTML, WordPerfect 6.1 is less than fluent. For this you'll need WordPerfect Internet Publisher, a free add-on that's barely worth the price. Download a copy of wpipzip.exe from PC World Online. ▶

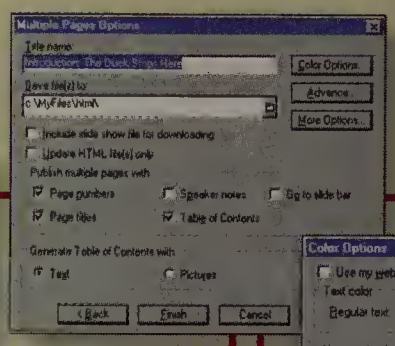
From Presentation to WEB PAGE in Five Easy Steps



When you turn a presentation into a series of Web pages in Corel WordPerfect Suite Presentations, you get plenty of options for controlling the look of your site.

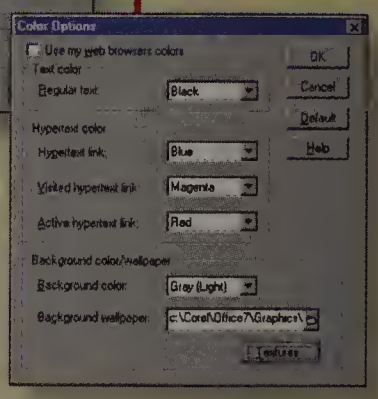


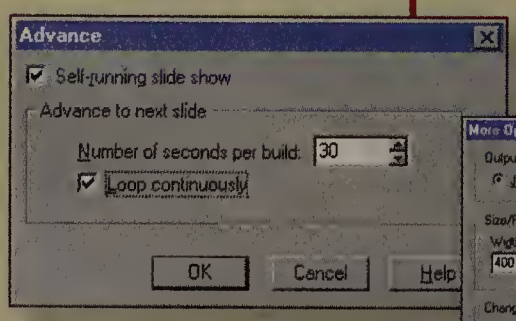
❶ Select *File•Publish To•Internet* and choose the kind of site you want.



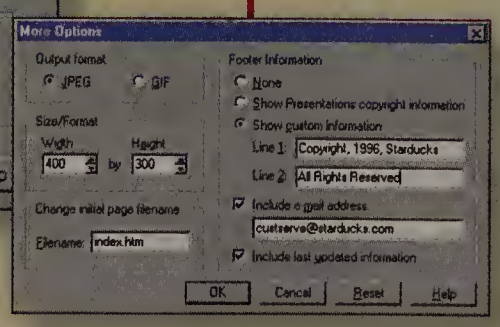
❷ The buttons in the upper right of the Multiple Pages Options dialog box let you control style and content.

❸ Click *Color Options* to set colors and assign wallpaper.

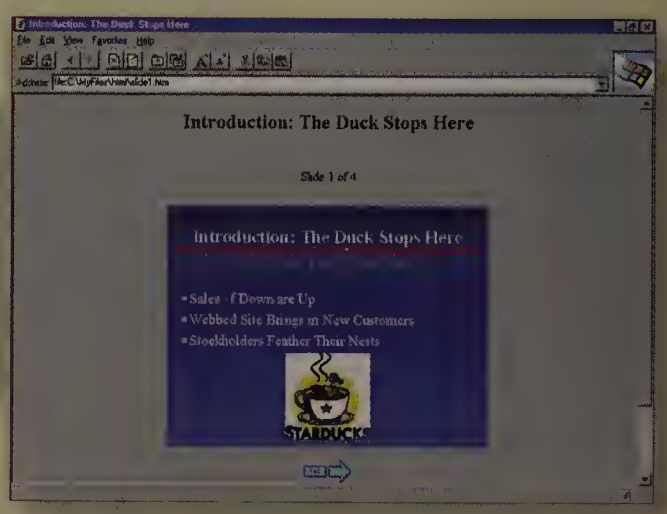




❹ *Advance* lets you create a self-running presentation on your site.



❺ With *More Options* you control other details on your site, such as copyrights and e-mail addresses. Click *OK*.



Voilà—an instant Web presentation.

Give them Back-UPS® Office™ this holiday and they'll thank you 120 times a month

Take the Multipath™ Quiz for a chance to win a $2,000 Shopping Spree

The holiday season is a happy time, unless the overload of flashing lights or a starting furnace causes a power sag. Then your computer pays the price for holiday cheer. A recent study by IBM showed that the typical computer experiences power problems up to 120 times a month. In fact, corrupt power is the largest single cause of computer data loss and hardware damage.

Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath™ safety net under any remaining integrated peripherals, like modems, printers, fax machines and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large transformer blocks.

Unique Multipath protection keeps your PC and data safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive PC.

APC Uninterruptible Power Supplies provide instant battery backup to protect your data from damage. Units are even covered by up to $25,000 in Lifetime surge protection insurance. No wonder the world's leading computer experts recommend APC.

Back-UPS Office's compact design installs easily on desktop, floor or mounts to wall

Back-UPS Office protects your entire system

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath™ protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a 250 VA UPS, guaranteed up to $25,000 (see policy for details).

LIFETIME EQUIPMENT PROTECTION

$25,000

FOR AS LONG AS YOU OWN THIS PRODUCT, IF YOUR PROPERLY CONNECTED EQUIPMENT IS EVER DAMAGED BY AN AC SURGE, INCLUDING SURGES DUE TO LIGHTNING, APC WILL REPAIR OR REPLACE OUR PRODUCT AND UP TO $25,000 OF CONNECTED EQUIPMENT (SEE POLICY FOR DETAILS. VALID IN U.S. AND CANADA ONLY).

PC MAGAZINE

"...for any PC today--especially if you run your business on it — [a UPS] is an indispensable peripheral." — PC MAGAZINE

APC has won more awards for reliability than all other UPS vendors combined.

LAN TIMES READERS' CHOICE 1996

APC Multipath Quiz Rules:
Follow the instructions on the reply card for a chance to win a shopping spree at a participating store (listed below).

Prizes:

First: **$2,000**
Second: **$1,000**
Third:.....**$500**

Complete the quiz at www.apcc.com and be entered in a second drawing for a free t-shirt! All entries must be received by 12/01/96. Drawing to be held 12/15/96.

COMPUSA · MICRO CENTER · Fry's ELECTRONICS · WIZ

WIN A $2,000 SHOPPING SPREE!

Answer the quiz questions correctly (Hint: Answers are in the ad), fill out the information below completely and send to APC or enter from our PowerPage™ on the Web, for a chance to win a $2,000 Shopping Spree. We'll send you a Free 60 page Power Protection Handbook just for trying.

1. Multipath power protection means surge suppression on...
   ☐ Dataline ☐ Computer AC ☐ Peripheral AC ☐ All of the above
2. APC will repair or replace any equipment properly attached to a Back-UPS Office up to...
   ☐ $1,000 ☐ $5,000 ☐ $25,000
3. If I plug my external modem into a surge suppressor and the dataline into the wall, my computer is safe from power problems. ☐ True ☐ False
4. My transformer block plugs will fit Back-UPS Office without covering an extra outlet
   ☐ True ☐ False

Name:_____ Title:_____

Company: _____

Address: _____

_____

City: _____ State:_____ Zip:_____ Country: _____

Phone:_____ Fax: _____

E-Mail: _____

Is this your first contact with APC? ☐ Yes ☐ No I am an ☐ End User ☐ Reseller

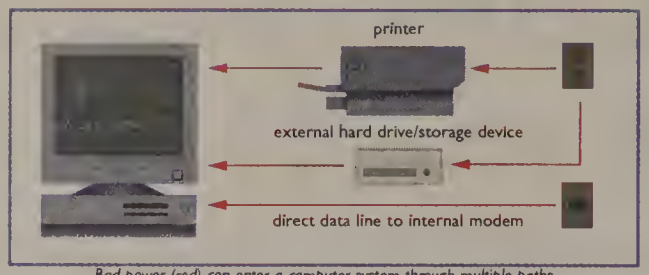
# of workstations on site/sold per month:_____ Brand of UPS currently used/sold: _____

Over 6,000,000 satisfied customers insist "Protect ME! with APC".

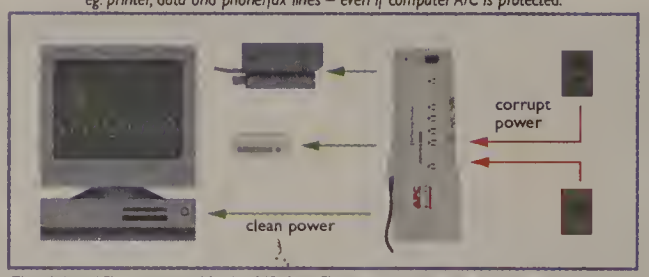
Steve Richbourg
Senior Power Quality Engineer
Gulf Power Company

"I just got my first Back-UPS Office. I've purchased seven since because people keep stopping by my desk and saying they wont it! Recommending power protectian is what I da far a living, and I've never had an upset customer in mare thon four years recammending APC."

Multipath™ Means Total Power Protection



Bad power (red) can enter a computer system through multiple paths eg. printer, data and phone/fax lines – even if computer A/C is protected.



The Multipath™ protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Back-UPS Office award-winning features:

Integrates the Security of a Surge Suppressor with the Power of a UPS
Six outlets guard your hardware with full-time surge protection. Three of the six outlets provide instantaneous battery backup to keep your system from crashing in the event of brownout or blackout.

Internet Ready Fax/ Modem Protection
Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents surges from damaging internal & external modems, motherboards, 10 Base-T lines, input/output cards, and other system components.

Convenient BlockSafe™ Outlet Spacing
Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks.

Master On/Off Switch
One switch conveniently controls power to entire connected system.

Electrical Wiring Fault Indicator Saves Trouble and Expense
Without a proper ground, most surge protection is useless. Back-UPS Office alerts you to wiring problems such as a missing ground and reversed polarity, two common miswirings which otherwise would require an electrician's visit to diagnose.

Circuit Breaker
Provides protection in the event of an overload or short circuit; no fuse, no hassle.

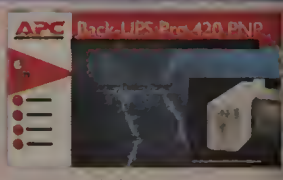
Check Battery Warning Prevents Downtime Before it Occurs
An LED signals when Back-UPS Office's internal self test finds the battery near the end of its life, giving you 6-8 weeks warning.

$25,000 Equipment Protection Policy
If your properly connected equipment is ever damaged by an AC surge, including surges due to lightning, APC will repair or replace our product and up to $25,000 of connected equipment for as long as you own your Back-UPS Office. (See policy for details.)

User Replaceable Batteries
Back-UPS Office has user replaceable batteries that can be be easily swapped out, saving time and expense: no need to return the UPS to the factory for service. Batteries last 3-6 years under normal usage.

2 Year Warranty
Unmatched reliability means you can purchase all APC products with confidence.

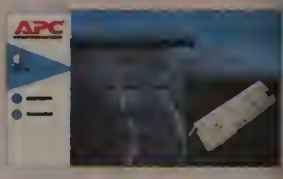
Choose the Right APC Protection



- For **advanced PC protection,** including automatic voltage regulation, CellGuard battery management and phone line/10BaseT protection, choose the Back-UPS Pro. For longer runtime choose a higher VA rating.

Back-UPS PRO Advanced PC Protection:
For Pentium, 486, Win 95, and Business Applications

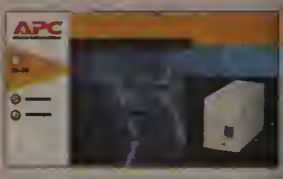
Volt-Amp Rating	List Price	Runtime*
280PNP	$199	6 min.
420PNP	$339	8 min.
650PNP	$419	17 min.
1000**	$589	35 min.
1400**	$759	74 min.



- For **Multipath™ PC and peripheral protection,** choose new Back-UPS Office, featuring 6 outlets with guaranteed surge protection, 3 of which provide instantaneous battery backup, fax/modem protection, and BlockSafe™ outlet spacing for the accommodation of all size plugs and transformer blocks.

Back-UPS Office Multipath™ Protection
For 386, Entertainment, education & all peripherals

Volt-Amp Rating	List Price	Runtime
250	$179	10 min.



- For **Basic PC protection,** choose from the Back-UPS family (software not included).

Back-UPS Basic PC Protection:
For 286, 386, Entertainment, and education

Volt-Amp Rating	List Price	Runtime*
200	$119	-
280	$139	7 min.
400	$199	13 min.
450	$254	24 min.
600	$359	31 min.
900	$529	47 min.
1250	$689	75 min.

- **For Fileserver protection,** ask for our award-winning Smart-UPS® line (not shown).
- **For Datacenter protection,** ask about our Matrix-UPS line (not shown).
- **For hardware-only surge protection,** ask for APC's SurgeArrest™ line (not shown).

*Runtime shown is for typical Pentium desktop system and may vary with your actual load.
Note: Back-UPS 200 not recommended for Pentium systems
**Does not include FREE PowerChute Pro Power Management Software.

You can also register to win at the PowerPage™ on the World Wide Web at http://www.apcc.com

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Crash-Proofing Your SUITE

BACKING UP DATA is a good idea, but why waste time copying a humongous suite that you can always reinstall from a CD-ROM? The only files in your suite that you need to back up are the configuration files you've tailored to your needs, and these files can probably fit on a single floppy.

Then, if disaster wipes your suite off your hard disk, all you need do is reinstall it, then restore these files to their proper locations. You'll be back in action in no time. Note: Depending on your installation, these files may be in directories other than those listed.

OFFICE 4.3

```
c:\windows\*.ini
c:\msoffice\winword\winword.opt
c:\msoffice\winword\templates\*.dot
c:\windows\msapps\proof\*.dic
```

OFFICE 95

```
c:\windows\*.ini
c:\msoffice\excel\excel7.reg
c:\msoffice\winword\winword7.reg
c:\msoffice\templates\*.dot
c:\program files\common files\microsoft shared\proof\*.dic
```

PERFECTOFFICE 3.0, WORDPERFECT SUITE 6.0

```
c:\windows\*.ini
c:\windows\wpcset.bif
c:\windows\*.sup
c:\office\wpwin\macros\*.wcm
c:\office\wpwin\template\*.*
```

WORDPERFECT SUITE 7.0

```
c:\windows\qpw.ini
c:\corel\office7\quattro7\qpw.reg
c:\corel\office7\template\*.wpt
c:\windows\wt61us.uwl
c:\windows\profiles\username\wt61us.uwl
```

SMARTSUITE 4.0

```
c:\windows\*.ini
c:\lotsuite\wordpro\smasters\default.mwp
c:\windows\lotusapp\spell\ltsuser1.udc
```

SMARTSUITE 96

```
c:\windows\*.ini
c:\lotus\approach\approach.reg
c:\lotus\wordpro\wordpro.reg
c:\lotus\flg\flw3.reg
c:\lotus\smasters\123\*.*
c:\lotus\smasters\wordpro\*.*
c:\lotus\smasters\approach\*.*
c:\lotus\smasters\flg\*.*
c:\lotus\compnent\spell\*.udc
```

Place the file in a temporary directory, then double-click it to extract the files. One of the extracted files is setup.exe. Double-click it to install Publisher and a copy of Netscape Navigator 1.1.

Internet Publisher installs fine; using it is the problem. You can't just save a WordPerfect document as an HTML file. Here's what you have to go through:

1. Select *File•New.* In the Select Template list, choose *HTML document,* then choose *Select.* Type a title for your document, then click *OK.*

2. Load the document you want to convert. Select *Edit•Select•All,* then *Edit•Copy.* Switch to the new HTML document and select *Edit•Paste Special.* In the resulting dialog box, choose *Unformatted Text,* and click *OK.*

3. Because you have to paste the document as unformatted text, all your formatting is now gone. You'll have to go through the new document, reformat it using the HTML toolbar, and insert graphics as .gif or .jpg files.

4. Save the new file first in WordPerfect format, then select *HTML•Export as HTML* on the toolbar.

The Windows 3.*x* version of Presentations offers no way to turn a presentation into an HTML file.

WORDPERFECT SUITE 7.0

UNLIKE THOSE OF ITS 16-bit cousin, WordPerfect Suite 7.0's Web tools are first-rate. WordPerfect 7, Quattro Pro, and Presentations can all save HTML files as is. Presentations is especially well suited for creating Web pages.

To convert a WordPerfect document into an HTML document, select *File•Internet Publisher,* then select *Publish to HTML.* WordPerfect will automatically convert tables, graphics, and other elements into their HTML equivalents.

Like its competitors, Presentations helps you turn a presentation into a series of Web pages, with each slide represented as a graphic on its own page. Select *File•Publish To•Internet* for a dialog box with plenty of choices for formatting your site. Be sure to check out the various Options buttons, which offer even more possibilities. For instance, this is the only presentation program of the three that lets you set your Web pages' background color. (See "From Presentation to Web Page in Five Easy Steps.")

JOB #4

Mailing to the Masses

NOW THAT YOU'VE created this report and turned it into a dynamite presentation and compelling Web page, what else must you do with it? That's right, you have to mail it to all the stockholders along with a personalized cover letter. Time to do a mail merge.

What if the list of stockholders is in a database or spreadsheet file? Surprisingly, most of these suites make it easy to merge from a data file or worksheet.

MICROSOFT OFFICE (BOTH VERSIONS)

WORD IS THE OBVIOUS TOOL for this job—it can merge data from all sorts of programs. Here's how:

1. Select *Tools•Mail Merge.* In the resulting dialog box called the Mail Merge Helper, select *Create•Form Letters.* That brings up ▶

It's Only Logical That Intelligent Manageab

(Now, What The Heck Is In

Intelligent Manageability is kind of like Extra Sensory Perception for a computer and every new Compaq Deskpro has it. It lets you know if something's going to happen before it actually does. This way you can manage all of the desktops on your network from one location.

Taking inventory, for instance, of all hardware and software is done simply and efficiently from one Deskpro. Or if a hard drive's about to fail anywhere, you'll know ahead of time. As before, Intelligent Manageability backs up your data on the network in case of failure; but now, thanks to our new PD-CD drive backup, it also preserves your data locally.

Okay, so our newest version of Intelligent Manageability is smart. But affordable? Considering that the Deskpro line from Compaq starts at around $1,100,* we think so.

Equally impressive are the high-performance features. Up to Pentium® Pro 200 processors. Choice of PCI graphics. Plus a choice of EIDE and Ultra SCSI hard drives.**

And maintenance? That's easy because we deliver continually updated support software via our Web site and CDs. And so is upgrading and servicing, thanks to a quick-release CPU hood and accessible components.**

In the end, Intelligent Manageability gives you a lowered cost of

I'm burnt.
I need a vacation.

intel inside
PENTIUM® PRO PROCESSOR

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TELLIGENT MANAGEABILITY?)

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ownership, a three-year warranty and dedicated toll-free technical support that's open for business seven days a week, 24 hours a day. And what could possibly be more logical than that? For more, visit us at www.compaq.com or call 1-800-392-8883.

*The Deskpro line starts at around $1,100.**

COMPAQ

Has It Changed Your Life Yet?

aler prices may vary. **Features vary by model. Monitor not included. Thermal sensor available only on Deskpro 4000 and 6000. Some features available with Compaq Deskpro and independent software applications. Other features only available
demarks or registered trademarks of their respective companies.

Circle 35 on reader service card

another dialog box, where you select *Active Window* to create your letter in the current document or *New Main Document* to start one from scratch.

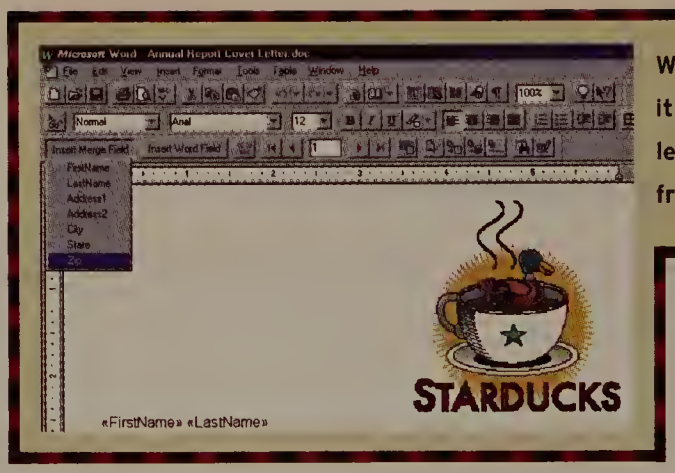
2. This will bring you back to the Mail Merge Helper, where you select *Get Data•Open Data Source*. In the next dialog box, choose the type of file your data is in (MS Access Database, MS Excel Worksheet, and so forth), then select the file itself. Depending on the data type, you may get other prompts; for instance, if your data is in Access, you'll have to pick a table or a query within the file.

3. At this point, Word will ask you if you want to edit the main document. You do, so click *Yes*.

4. Now you should be in a regular Word document window with one additional toolbar, the only sign that there's something different going on. Type your document as you normally would. To insert field names, click the *Insert Merge Field* button.

5. When you're done writing, there are two options for merging your letter with your data. If you're not absolutely sure that everything will work perfectly, click the *Merge to a New Document* icon. This will put the merge results on screen as a new Word document that you can examine and correct before printing with *File•Print*. On the other hand, if you're sure things will go smoothly and you've got a very large database, it's faster to click the *Merge To Printer* icon.

One note: You have the option to print only certain records, say California stockholders with first names starting with the letter *Q*. Select *Tools•Mail Merge* and click *Query Options* for tools you'll need. You'll also find tools for sorting your data for the merge. For instance, you may want your letters printed out in zip code order.



WORD 7.0'S MERGE TOOLBAR makes it easy to insert data fields into a form letter, taking the field names directly from an outside data file.

LOTUS SMARTSUITE (BOTH VERSIONS)

THERE'S NO REASON to bother with Word Pro. SmartSuite's database, Approach, comes with a simple word processor that's tailor-made for mail merge. And don't worry if your data isn't in Approach files: The program can read a variety of other data formats, including 1-2-3. Here's what to do:

1. Open Approach and load your data file. Select *Create•Form Letter* to call up the Form Letter Assistant, which helps you set a general layout, put fields into the address, create your salutation, and set other options.

2. Click *Done*, and you'll see a normal document editing screen. Type the body of your letter. If you need to add any other fields, click the *Insert Field* icon.

3. Use *File•Print* to print the current record, all records, or a range of records.

But what if you want to print records only for, say, green-eyed stockholders in Michigan? The trick to filtering out certain records differs depending on your version of Approach.

Approach 3.x: Click the far-left button on the status bar at the bottom of the screen (it will probably say something like 'Form Letter 1'), then select any other option. Click the *Browse* icon, then click the *Find* icon. Fill in the form with your search criteria. For instance, to limit the mailing to people in Michigan, enter **MI** in the State field and press **<Enter>**. Return to your form letter by clicking the far-left button on the status bar again and selecting your form letter.

Approach 96: Click the *Find* button to bring up the Find/Sort Assistant. From there you'll be able to set the search conditions (State = "Michigan"), sort the data by the fields of your choice, and save the whole collection of settings for future use.

COREL WORDPERFECT SUITE AND NOVELL PERFECTOFFICE (ALL VERSIONS)

THERE'S ONE LIMITATION to merging in WordPerfect: You have to bring your data into WordPerfect first.

1. In WordPerfect, select *Insert•Spreadsheet/Database•Import*.

2. Select the format of your data, such as *Paradox*. In the Import As list, select *Merge Data File*.

3. Click the *File Folder* icon, locate the database, and double-click *OK* to import the data.

4. Save, then close the resulting document.

Now that you've created this merge data document, you'll be able to set up the mail merge:

1. Back in a blank WordPerfect document, select *Tools•Merge* to open the Merge dialog box.

2. Click *Form*.

3. In the Create Form File dialog box, click the *File Folder* icon to browse for and select the data file that you just created.

4. The Merge toolbar will appear. Insert field names by clicking the *Insert Field* button, adding needed punctuation as you go.

5. When your fields are in place, select *Close* and start typing your letter.

6. After you've finished, click the *Merge* button on the toolbar. In the Perform Merge dialog box, choose either *<New Document>* or *<Printer>* for your output.

To send letters to a particular list of people—say, stockholders in Alaska who were born before 1905—click *Select Records* and enter your search criteria in the resulting dialog box. Click *OK* when you're done. ■

George Campbell is a contributing editor and Lincoln Spector a senior associate editor for PC World.

I N T E R N E T

FIND THESE TIPS and all the files mentioned in this article on PC World Online (**http://www.pcworld.com**). Got better tips? Share them with others on **http://www.pcworld.com./suite_talk**.

The Vision

EYE CONTACT

AUSTIN BUILDS CONFIDENCE

Austin's Global Reach: The World According to IPC

Austin is a division of IPC Technologies. When you call Austin, you're tapping into the many benefits of a diversified global organization with interests in notebook PCs, desktop systems, and departmental servers. As your company's needs expand and evolve, you can rely on Austin's global perspective and 14 years of experience to deliver an integrated computing solution.

A Critical Eye

Austin projects eye-catching confidence with a comprehensive product line that includes **high-end notebooks**, **reliable desktop systems**, and **bullet-proof departmental servers**. We invite closer scrutiny, because all Austin systems are configured for performance and priced for value. And each machine is backed by superior service and support. **Make contact with Austin.**

Our Mission: Absolute Customer Satisfaction

Quality is our watchword, and our mission is absolute customer satisfaction. We're certain that our personal attention and higher level of craftsmanship will make the difference for you. Austin is proven in the PC industry — we've won the **5-Star Service Award** from *PC Computing* and the **Industry Information Technology Award** from *Government Computer News*. Call now and put Austin's commitment to work for you. ***Seeing is Believing.***

Austin's Family of Products

- *Austin Edge™ Series Notebook Systems: Includes Intel®'s 430MX™ PCI Set and support for internal CD-ROM*
- *Austin PowerPLUS™ Desktop Systems: Our profile for success features Pentium® and Pentium Pro technology and custom configuration options*
- *Austin Affinity™ Departmental Servers: Quad Pentium Pro processors with 12 hot-swap drive bays and enhanced cooling for mission-critical reliability*

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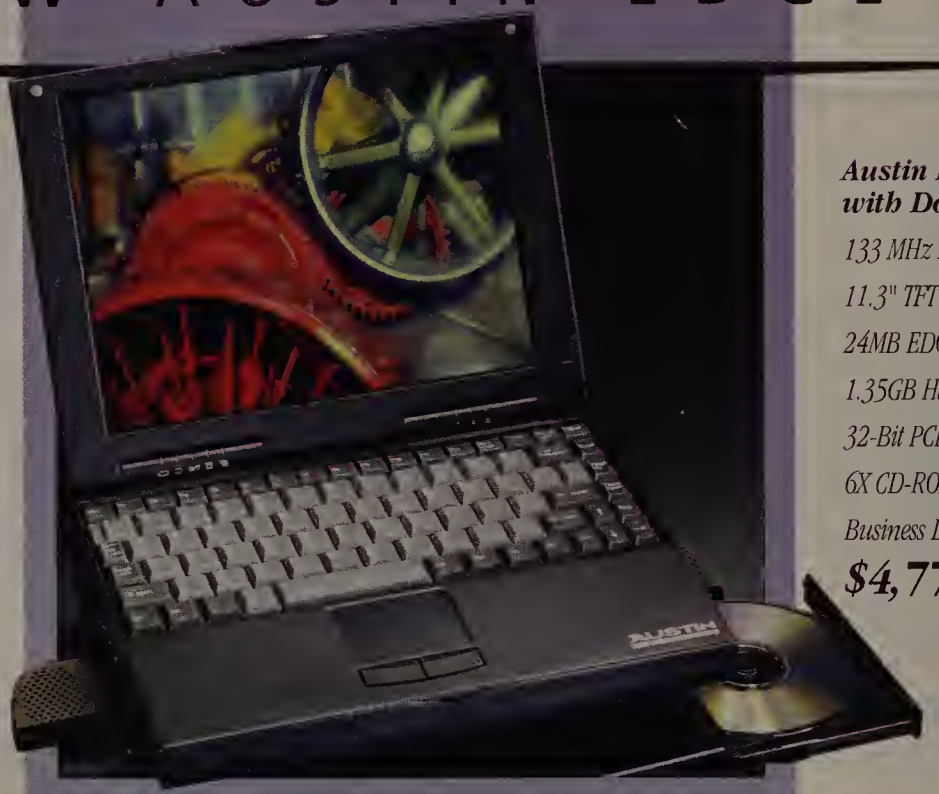
Notebook Solutions

SHARP

THE NEW AUSTIN EDGE DUET



Austin Edge Duet™ Standard Features:

Base Unit:

Intel 430MX PCI Set
256K Pipeline Burst L2 Cache
3.5" Diskette Drive, (Use external with Base Unit or mount in Docking Station)
28.8 Fax/Modem w/ Speakerphone
16-Bit Stereo Business Audio, Built-in Mic, Speaker & External Line-In/Out
Lithium-Ion Battery
Integrated Glide Point® Mouse
Base System Weight with Battery: 4.7 lbs.
Win '95 Plug n' Play BIOS and Windows® 95 Pre-Installed

Portable Docking Station:

6X CD-ROM Drive
Feature Bay for 3.5" Diskette Drive
Built-In 10Base-T Ethernet
Retractable Stereo Speakers w/ Subwoofer
Docking Station Weight: 2.0 lbs.

Austin Edge CD Notebook Standard Features:

Intel 430MX PCI Set
Internal 3.5" Removable Diskette Drive, (Swappable w/ 2nd Battery or 6X CD-ROM)
256K Pipeline Burst L2 Cache
16-Bit Stereo Business Audio, Built-in Mic, Speakers & External Line-In/Out
Lithium-Ion Battery
28.8 Fax/Modem w/ Speakerphone
Integrated Glide Point® Mouse
Weight with Battery: 6.8 lbs.
Win '95 Plug n' Play BIOS and Windows® 95 Pre-Installed

intel inside
pentium® PROCESSOR

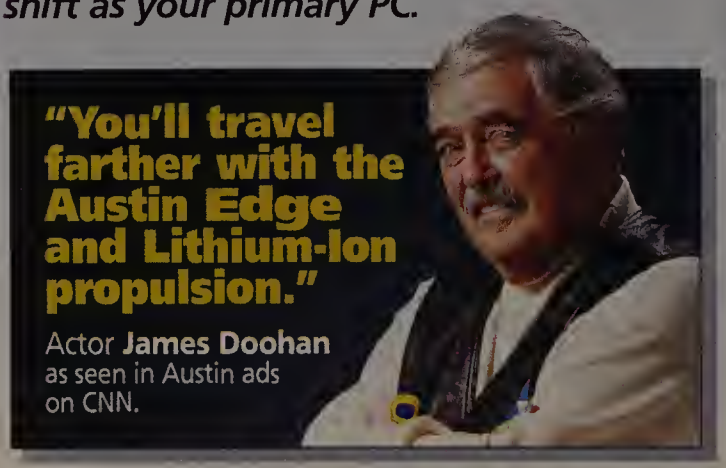
Ad Code: 1501

Take a Second Look

Austin notebooks are second nature for our demanding customers who work hard and travel light. Now the **Austin Edge Duet,** with its **network-ready** docking station, **high-capacity hard drive**, and **knock-em-dead display**, does double duty as a full-featured desktop computer.

Double Life

You need the high-profile presence of the **Edge Duet** portable multimedia system, with **6X CD ROM** drive, for high-impact presentations. Now you have the added convenience of a notebook that simply plugs into a docking station ***and works a double shift as your primary PC.***



Austin Edge Duet – 133 with Docking Station

133 MHz Intel® Pentium® TCP Processor
11.3" TFT 800 x 600 Color Display
24MB EDO RAM (expandable to 48MB)
1.35GB Hard Drive
32-Bit PCI Windows Accelerator – 1MB
6X CD-ROM Drive
Business Lease: ***$143 / month***

$4,774

Austin Edge CD – 133

133 MHz Intel Pentium Processor
11.3" TFT 800 x 600 Color Display
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August 1996
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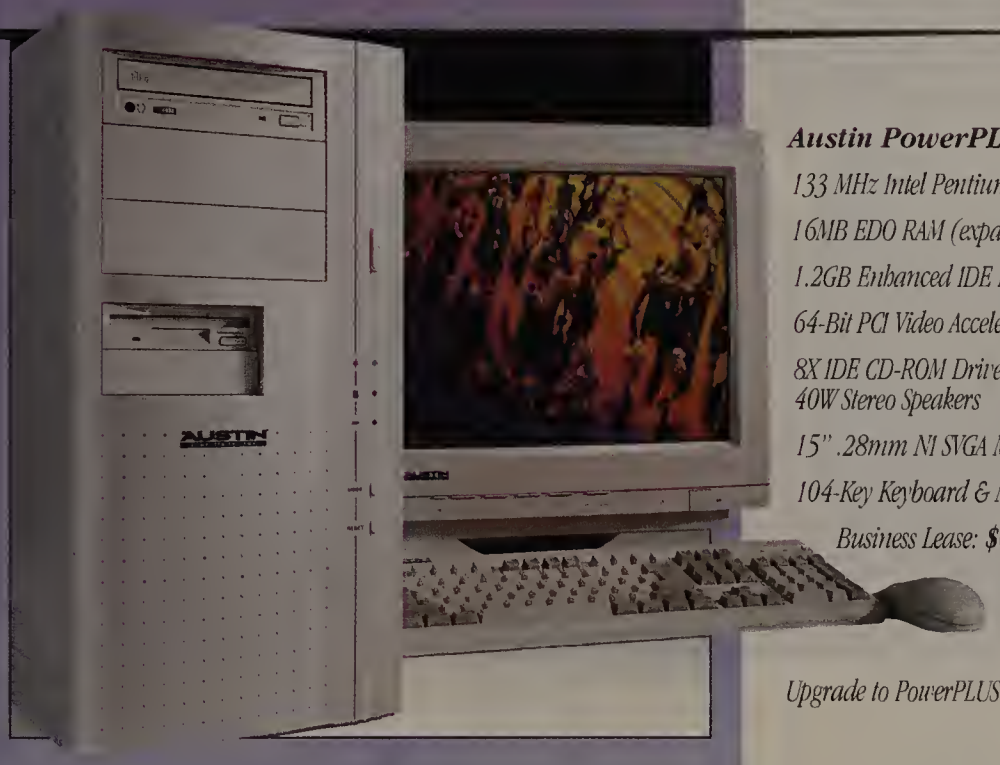

Austin PowerPLUS System Standard Features:

Intel 430HX PCI Set

Intel TC430HX Motherboard

100-, 120-, 133-, 150-, 166-, or 200 MHz Intel Pentium Processor

256KB L2 Pipeline Burst Cache

3.5" 1.44MB Diskette Drive

Mid-Tower ATX Chassis

Win '95 Keyboard & MS Mouse

Energy-Star Compliant

Windows '95 Pre-Installed

Three-Year Parts & Labor Warranty, One-Year On-Site Service

Austin PowerPLUS 133

133 MHz Intel Pentium Processor

16MB EDO RAM (expandable to 128MB)

1.2GB Enhanced IDE Hard Drive

64-Bit PCI Video Accelerator – 2MB DRAM

8X IDE CD-ROM Drive, 16-Bit Audio, 40W Stereo Speakers

15" .28mm NI SVGA Monitor

104-Key Keyboard & Mouse

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Austin Élan Workstation Standard Features:

Intel 440FX PCI Set

Intel VS440FX Motherboard

180- or 200 MHz Intel Pentium Pro Processor with integrated 256K or 512K L2 Pipeline Burst Cache

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128-Bit PCI Video Accelerator – 2MB MRAM

8X IDE CD-ROM Drive, 16-Bit Audio, 40W Stereo Speakers

15" .28mm NI SVGA Monitor

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TOP 100

200 Power Desktops

208 Budget Desktops

218 Notebooks

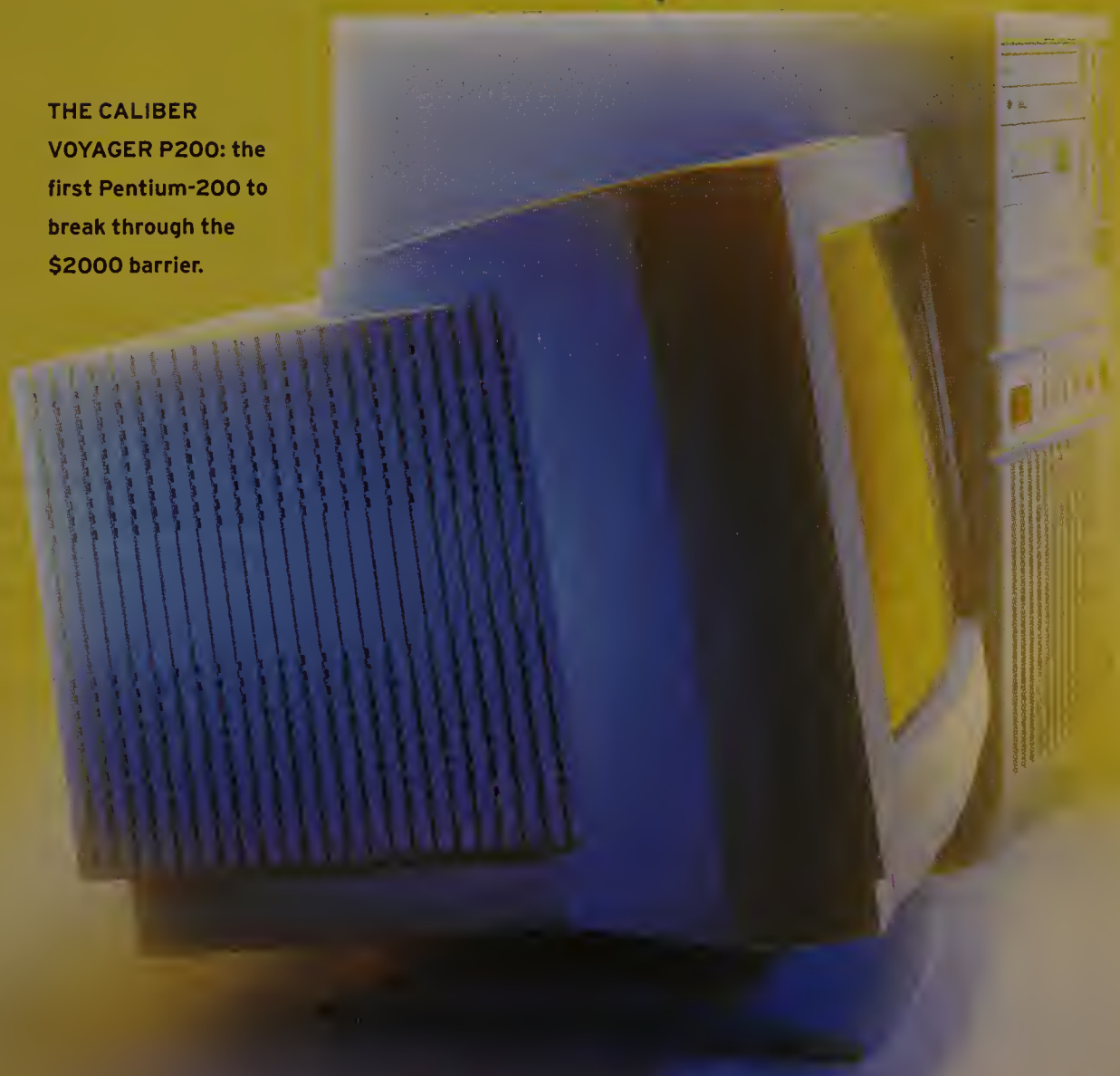
233 Printers

237 Monitors

241 Graphics Boards

243 Modems

A P-200 for under $2000



THE CALIBER VOYAGER P200: the first Pentium-200 to break through the $2000 barrier.

BY [redacted] TARRANCE

Don't lend money to a friend. Don't eat before swimming. And don't buy a PC with the latest processor, because it will cost too much. Even sound advice needs updating every once in a while. Only one month after our first Top 20 reviews of Pentium-200 PCs, you can pick up a system equipped with Intel's latest Pentium processor for less than $2000. That's an amazing price for machines using a chip still ▶

PHOTO: MARC SIMON; ICONS: JEFFREY PELO

hot off the assembly line. The first of these budget-price P-200s is the $1829 Caliber Voyager P200. Reviewed with Top 20 machines for September, the Caliber is seventh on our Budget chart after a $370 price drop. Cheap Pentium-200s are not limited to smaller vendors. Dell is leading off its new "v" line of budget PCs with the Dimension P200v, which will sell for $1999. (See *New Products* in this issue, and look for our review of the P200v in next month's Top 20 Budget Desktops.)

How can vendors afford to do this? Two reasons: Intel started out selling its new P-200 low—20 percent below the initial price of its P-166. At the same time, the cost of other PC components—especially memory—dropped into the cellar. In the past, Intel typically priced a new processor much higher. This seeming largesse may really be an attempt to head off Cyrix's fast, aggressively priced new P200+ processors. But for consumers it means more power and better prices. (See next month's Top 20s for reviews of the first CxP200+s.)

MORE SPEED FOR LESS

CONFUSED ABOUT THE difference between a budget PC and a power PC? So are we at times. Not long ago, a budget buyer had to settle for a slow processor, a small hard drive, limited RAM, and few extras. Now a typical budget PC on our chart is a Pentium with 16MB of RAM, a 15-inch monitor, a 6X or 8X CD-ROM drive, 2MB of video RAM, and a hard disk with over 1GB of storage. Nearly all have sound cards, and most have speakers. That's more than enough for the typical user, and it's available for $2500 or less—the amount our research identifies as the most that readers expect a low-priced PC to cost.

DELL'S LATITUDE LM P133ST: one of the first notebooks we've tested that's as fast as desktops in the same processor class.

On our Budget Desktops scorecard, notice that price gets a heavier weighting than it does in the Power scorecard—25 percent of the total versus 15 percent. Speed is more important for power systems, so for them we give performance more weight (25 percent). With budget PCs, performance is weighted 15 percent.

With one of the power machines on our charts, you get bigger, better, and faster components. Processors range from Pentium-166s to Pentium Pro-200s, and many systems have 32MB of RAM, hard drives larger than 2GB, 17-inch monitors, and more capable video cards.

Despite these differences, budget desktops still perform very well in the business apps our readers use most. If you average the PC WorldBench scores for the 20 systems on our Budget chart, you get 177—pretty good considering that the average power system scores 210, just 19 percent better. You pay plenty for the difference. The average Top 20 budget PC is about $1875. The average Top 20 power system? About $3450—or over 80 percent more.

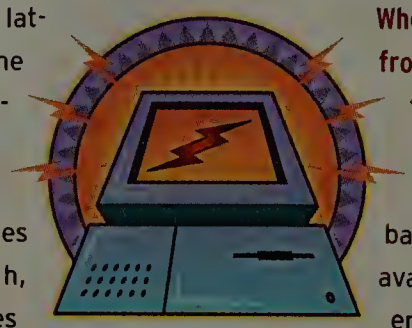
WHAT'S NEW

THE FAST MULTIWAVE Ultra Power was the only PC tested this month that made our Top 20 Power Desktops. Dell's Dimension and OptiPlex models continue as Best Buys, with two Pentium-200s and two Pentium Pro-200s. Our other Best Buy goes to the Micron P200 Millennia, which is now $710 cheaper.

ABOUT THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 14 for contact information.

How do the charts work? The Top 20 and Top 10 charts are constantly changing lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. Every month we test the latest products in each category and compare them to the existing pool of products we've reviewed. As new products earn a place on the charts, those at the bottom drop off.



Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? It's the sum of all our tests—both hands-on evaluations and objective benchmark scoring. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't make it onto the chart.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A system that scores 200, for instance, is twice as fast as our baseline unit, while one that scores 82 is 18 percent slower.

Where do the reliability and service and support scores come from? For PCs, the reliability score and the "service" portion of the service and support score come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The support score is based on the vendor's support policies (length of warranty, available support hours, toll-free lines, and so on). Together they form our service and support score.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For example, a budget PC that is rated "expensive" is high-priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in comparison to other power notebooks. Word scores for other categories, such as features and design, are relative to all desktops or all notebooks.

This month we also looked at the new IBM Aptiva C65 P-166, which IBM asked us not to include here, insisting that it was sent only for our @Home section. You'll find its review there, even though it has a typical power desktop configuration.

The Budget Top 20 saw a greater infusion of new PCs, and it lost last month's highest-ranked PC—the Dell Dimension P100t. Dell is replacing the "t" line with the "v" series and says it will replace the P100t with a new P133v at a similar price. (We'll review the P133v in an upcoming issue.) The Micron P133 Millennia—a former power Best Buy—now tops our budget Best Buys, followed by Dell's OptiPlex GXM 5100, Gateway 2000's P5-120, Quantex's QP5/100 M-3, and Vektron's Multimedia P-100.

Four of the new systems we reviewed made this month's Budget list: the $2444 Gateway 2000 P5-166, the $1880 ProGen Atlas P-150, the $2003 SAG Electronics STC Ultra Cyrix 6x86 P166+, and the $2049 DirectWave Blue Thunder P133 MVP Pro.

Dell's new $3999 Latitude LM P133ST—the fastest notebook we've tested—now heads this month's Power Notebooks chart. Our second Best Buy is also a Dell—the Latitude XPi P133ST. Two more of this month's new notes made our chart: the Gateway 2000 S5-100XL at $3349, and the $3299 Dell Latitude LM P100SD.

We also saw the $3750 EuroCom 6400T P-150, the first P-150 notebook we've reviewed. We can't recommend the EuroCom, as it is built around Intel's standard desktop version of the P-150 CPU. Most portables use Intel's notebook CPUs, which are smaller, run cooler, and include power management. The 6400T's battery life was under an hour—one of the worst yet—and it wasn't as fast as Dell's P-133. By the time you read this, Intel will have announced a P-150 for mobile PCs.

For the second month in a row, the Toshiba Satellite 100CS P-75 and the NEC Versa 550D Cx5x86-100 take the top spots on our Budget Notebooks chart. We also looked at Hitachi's first notebook, the $2199 C-090 D Pentium-90, which features a terrific five-year warranty. The Sceptre SoundX 3200 is also new this month. It's fast for a $2750 notebook, but it has an awkward pointing device.

TOP PERIPHERALS

THIS MONTH'S TOP 10 Printers is headed up by the same Best Buys as last time. The $379 Panasonic KX-P6100 is a quick, inexpensive personal laser with sharp print quality. The $389 HP DeskJet 820Cse started at the top of the color printers when we first tested it in June. Its fine color print quality and outstanding paper handling have kept it there ever since. We awarded a second monochrome Best Buy this month—to the $499 NEC SuperScript 860 for good speed, fine output, and versatile software.

For this month's review of 15-inch monitors, we used the same upgraded test suite we developed for last month's review of 17-inch models. Samsung sent us the latest version of its SyncMaster 15GLi; it's our new number one, thanks to a low $408 price, easy adjustability, and above-average text detail. Our other Best Buy, the $450 Mitsubishi Diamond Scan 15HX, has a slightly larger viewable area and sharp graphics and text.

This month's Top 10 Graphics Boards establishes a new top dog: VideoLogic's low-cost GrafixStar 600. This $159 card is impressively fast, as is the $199 STB Lightspeed 128, our second Best Buy.

With the help of a dramatic $133 price drop this month, the $275 U.S. Robotics Courier V.Everything V.34 28.8-kbps unit is now our top external modem. And in the PC Card list, the $199 Zoom V.34C garners a Best Buy along with the $280 Megahertz JX4288. A built-in phone jack and digital line warning message help the Megahertz justify its higher price. ▶

Rex Farrance is a senior associate editor for PC World. *Editorial Assistant Allyson Bates, Staff Editor John Goddard, Associate Editors Brad Grimes and Melissa Riofrio, Senior Associate Editor Bryan Hastings, Assistant Editor Eric Hellweg, Senior Editor Carla Thornton, and freelance writers Geoffrey Coffey and Jon J. Jacobi contributed to the Top 100. Testing for the Top 100 by Dave Casini, Ulrike Diehlmann, Jeff Kuta, Kevin Mitchell, Mike Salayko, and Susan Silvius; research and support by Andrew Hawn and Julian Weatherby.* *See page 14 for contact information.*

MAKE YOUR OWN TOP 100

MISSED A REVIEW? Wondering why a certain PC or peripheral didn't make our charts? PC World Online (http://www.pcworld.com) puts even more Top 100 information at your fingertips. To find past coverage of a hardware product, including reviews, just go to the headings Current Issue, Hardware, or Mobile Computing. You can search the last 18 months of *PC World* coverage of systems, monitors, modems, graphics boards, and printers. PC World Online also includes reviews you won't find in print—those of products that didn't make the Top 100 cut. To go straight to the reviews of these PCs, modems, and graphics boards, just use the URL provided in each Top 100 section. (This month the print versions of Top 10 Printers and Top 10 Monitors cover all models tested, including those that don't rank.)

Have you ever wished you could build your own chart based on your buying criteria? Now you can, using our Web site's Personal Shopper (found under the Buyer's Guide heading). Personal Shopper combines your criteria with *PC World*'s current data and test results to generate custom-built Top 20s. If you want PCs with P-166 or faster CPUs, 28.8-kbps modems, and prices under $3000, Personal Shopper will rank all that fit your specifications. We've added our printers to Personal Shopper, and in the coming months we'll add our other Top 10 reviews so you can build your own charts for modems, graphics boards, and monitors.

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PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (7/18/96)	CPU	Comments
1	**Dell Dimension XPS P200s** 800/613-3355 www.dell.com	1	Sept 96	$3329	Pentium-200	New case and hot graphics card; fast, but not faster than EDO DRAM systems.
2	**Dell OptiPlex GXpro 200** 800/613-3355 www.dell.com	2	Aug 96	$4532	Pentium Pro-200	Fastest system to date, modular design, built-in networking, good reliability rating.
3	**Micron P200 Millennia** 800/223-6571 www.micron.com	4	Sept 96	$2549	Pentium-200	Performs well for a P-200 with 16MB of RAM; huge $710 price drop.
4	**Dell OptiPlex GXMT 5200** 800/613-3355 www.dell.com	5	Sept 96	$4326	Pentium-200	Fast P-200 is networkable right out of the box; can't add many PCI cards.
5	**Dell Dimension XPS Pro200n** 800/613-3355 www.dell.com	3	Aug 96	$3499	Pentium Pro-200	Well-designed system is fast, but other Pentium Pro-200s are faster; $100 price drop.
6	Gateway 2000 P5-200XL 800/846-2000 www.gw2K.com	6	Sept 96	$3999	Pentium-200	Multimedia system with CD-recordable drive, modem, and lots of software.
7	Micron P166 Millennia Plus 800/223-6571 www.micron.com	7	Mar 96	$3348	Pentium-166	SCSI version of Micron's Millennia with Iomega Jaz drive; $301 price drop.
8	Quantex QP6/200 SM-2 800/896-4898 www.quantex.com	8	Aug 96	$3149	Pentium Pro-200	Better speed than number four Dell, but reliability rating is much lower.
9	IBM PC 350 800/426-2968 www.ibm.com	13	Sept 96	$4122	Pentium-200	Fast unit features new universal serial bus; $713 price cut, but still expensive.
10	Quantex QP5/200 SM-2 800/896-4898 www.quantex.com	9	Sept 96	$3099	Pentium-200	Inexpensive for a P-200, loaded with extras, very fast; reliability rating hurts.
11	HP Vectra 500 Model 515MCx 5/166 800/752-0900 www.hp.com	10	July 96	$3430	Pentium-166	HP's newest line good for small and home offices; includes voice mail.
12	ZDS Z-Station GT 500 800/533-0331 www.zds.com	11	Sept 96	$3570	Pentium-200	Fast, well constructed, $227 price drop; upside-down add-in cards are awkward.
13	HP Vectra VL Series 4 5/166 MT 800/752-0900 www.hp.com	–	May 96	$3290	Pentium-166	$625 price drop lifts well-designed PC; P-133 and P-200 versions also available.
14	Tangent Media Gem 800/829-2850 www.tangent.com	16	Sept 96	$2B95	Pentium-200	Fastest P-200 tested, nice built-in speakers, video input, $300 price drop.
15	NEC PowerMate P166 800/632-4636 www.nec.com	15	Aug 96	$2924	Pentium-166	Good-quality components, but performance isn't great for a P-166.
16	Multiwave Ultra Power 800/234-3358 www.mwave.com	–	new	$2520	Pentium-200	Fast, full-multimedia system with a 33.6-kbps modem at a near-budget price.
17	Xi Computer Pro 200 MTower SP 800/432-0486 www.win.net/xi_comp	20	July 96	$4199	Pentium Pro-200	Sturdy system with SCSI hard drive is fast; expensive even after $500 price drop.
18	Cyrix 6x86-P166+ PC 800/340-7501 www.cyrix.com	18	July 96	$3699	Cx6x86-P166+	$170 price drop, quick, loaded with software and multimedia hardware.
19	Vektron Optima Pro Station P200 800/725-0026 www.vektron.com	–	Sept 96	$3495	Pentium-200	$500 drop boosts fast PC with wavetable sound. Good video card but small monitor.
20	Austin PowerPlus 200 800/752-1577 www.austindirect.com	–	Sept 96	$2B99	Pentium-200	$100 price drop on PC with fast modem; monitor quality is just so-so.

Best Buy See features chart, page 202; performance chart, page 204. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available September 24). You can also order a previous month's Top 20 chart with capsule reviews plus features and performance charts ($4.50) and individual capsule reviews with features and performance charts ($1.50 each). Prices effective for the U.S. and Canada. Foreign orders are $15 for

THIS MONTH SOME PENTIUM-200s are approaching budget prices—Micron's $2549 P200 Millennia and Multiwave's $2520 Ultra Power, for instance. But we also looked at good PCs that didn't make the chart, due mostly to high prices. If you can afford the extra cash, the $3696 Acma zPower Series P200 tower is quick and versatile, has front-mounted PC Card slots, and can store your data on a removable 2.1GB IDE hard drive. The $3799 Amax Pentium Power Station P-200 is a fast tower PC for buyers who want the speed and flexibility of an Ultra Wide SCSI system. For more details on these and other new PCs that missed this month's cut, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

Overall rating	PC WorldBench score	Performance	Vendor's system reliability	Features and design	Price	Vendor's service and support	Reader service number	Fax reprint number [1]
88	208	very good	good	outstanding	average	best	640	3415
87	232	outstanding	good	outstanding	very expensive	best	641	3401
87	210	very good	good	outstanding	inexpensive	fair	642	3416
87	216	very good	good	outstanding	expensive	best	643	3417
86	211	very good	good	very good	average	best	644	3402
84	208	very good	fair	outstanding	expensive	good	645	3418
84	198	good	good	outstanding	average	fair	646	3331
82	224	very good	poor	outstanding	average	fair	647	3405
81	215	very good	fair	very good	expensive	good	–	3406
81	216	very good	poor	outstanding	average	fair	649	3419
81	192	good	good	very good	average	fair	650	3383
80	215	very good	fair	outstanding	average	poor	651	3420
80	197	good	good	good	average	fair	652	3362
79	220	very good	[2]	outstanding	average	[2]	653	3423
78	194	good	fair	very good	average	fair	654	3406
78	215	very good	[2]	very good	inexpensive	[2]	655	3430
78	221	very good	[2]	outstanding	expensive	[2]	656	3407
78	199	good	[2]	outstanding	average	[2]	657	3387
78	217	very good	[2]	outstanding	average	[2]	658	3431
76	201	good	[2]	very good	average	[2]	659	3432
Percentage of overall rating:		Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent		

advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews. [2] insufficient data.
FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 904.

This Month's Best Buys

NO. 1: DELL DIMENSION XPS P200S

PROS: Big hard drive, 8X CD-ROM drive, fast graphics card, 28.8-kbps fax-modem

CONS: A bit slower than we expected considering use of fast SDRAM; no speakers

Like most systems we've tested from a brand-new CPU class, the top-ranked $3329 Dell Dimension XPS P200s isn't as fast as we expected. But it's still quicker than any other Dimension Pentium model we've seen. It's particularly well designed, and it has the right overall mix needed to top our chart. But you can expect its PC WorldBench score of 208 to improve with future revisions to the system. For example, Dell should be able to get better performance out of its memory system: The recently released Intel chip set that Dell includes in its Dimension "s" series supports SDRAM, a type of main memory that's faster than today's popular EDO DRAM. But in our tests, the SDRAM-based Dimension lagged behind several Pentium-200 desktops that use EDO DRAM. As Dell tweaks this system, we expect its speed to improve.

Dell Dimension P200s

One thing Dell doesn't have to tweak is the graphics card. Our test system features the Number Nine Imagine 128 Series 2 with 4MB of VRAM. While this card adds more than $300 to the price of the system, it can handle all your graphics chores, including high-end image editing and desktop publishing. It even has 3-D hardware and support for CAD acceleration. Other notable features include an 8X CD-ROM drive, 512K of pipeline-burst cache, a crisp Dell 17-inch monitor, and a U.S. Robotics 28.8-kbps fax-modem. Inside this machine you'll find several nice touches: An extremely quiet fan inside the case augments the power supply fan, memory is supplied on DIMMs that can be added one at a time rather than in pairs, and a vertically mounted hard drive is placed just behind the internal speaker to save space.

We have criticized the Dimension "c" series in the past for having an on/off switch that resembled a floppy eject button. Time after time, *PC World* editors accidentally turned off their systems when they thought they were popping out a floppy. Dell fixed this problem with the new "s" series of minitowers. The on/off button is circular, slightly recessed, and smack in the middle of the front panel, far from the floppy drive. There's also a new wide foot at the base of the minitower to help prevent tipping.

Dell bundles Microsoft Office Professional with this system, but no speakers to go with the integrated sound chip. Standard speakers will cost another $36. Also, make sure you ask the company to include a Windows 95 CD-ROM. Dell tells us the standard procedure now is to load Win 95 but not send the CD- ▶

TOP 20 POWER DESKTOPS

STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS P200s*	Pentium-200	16	512	2.6	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	8X
2	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	4X
3	Micron P200 Millennia*	Pentium-200	16	512	2.5	Diamond Stealth 3D 2000	2/EDO DRAM	17/15.9	.26	8X
4	Dell OptiPlex GXMT 5200*	Pentium-200	32	512	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
5	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	8X
6	Gateway 2000 P5-200XL	Pentium-200	32	512	2.6	Matrox MGA Millennium	2/WRAM	17/15.9	.26	8X
7	Micron P166 Millennia Plus	Pentium-166	16	512	2.2	Diamond Stealth64 Video VRAM	2/VRAM	15/13.6	.28	8X
8	Quantex QP6/200 SM-2	Pentium Pro-200	32	256	2.6	Diamond Stealth64 Video 3200	2/VRAM	17/16.1	.26	6X
9	IBM PC 350	Pentium-200	32	512	1.6	integrated Trio64V+	2/EDO DRAM	17/15.5	.28	6X
10	Quantex QP5/200 SM-2	Pentium-200	32	512	2.6	Number Nine Imagine 128 Series 2	4/VRAM	17/16	.26	8X
11	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	1.6	integrated Trio64	1/DRAM	15/13.7	.28	4X
12	ZDS Z-Station GT 500	Pentium-200	32	256	2.6	integrated ATI-264VT	2/SGRAM	17/15.5	.26	8X
13	HP Vectra VL Series 4 5/166 MT	Pentium-166	16	256	1.6	Matrox MGA Millennium	2/VRAM	15/13.5	.28	4X
14	Tangent Media Gem	Pentium-200	32	512	2.1	STB Lightspeed 128	2/MDRAM	17/15.6	.28	6X
15	NEC PowerMate P166	Pentium-166	16	256	2.1	Matrox MGA Millennium	4/WRAM	15/13.5	.28	6X
16	Multiwave Ultra Power	Pentium-200	16	256	1.3	STB Lightspeed 128	2/MDRAM	17/16.2	.27	8X
17	Xi Computer Pro 200 MTower SP	Pentium Pro-200	32	256	4.3	Matrox MGA Millennium	4/WRAM	17/15.7	.25	6X
18	Cyrix 6x86-P166+ PC	Cx6x86-P166+	16	256	4	Matrox MGA Millennium	2/WRAM	17/16	.27	6X
19	Vektron Optima Pro Station P200	Pentium-200	32	512	4.3	Matrox MGA Millennium	2/WRAM	15/14.1	.25	6X
20	Austin PowerPlus 200	Pentium-200	16	256	2.1	VideoLogic Grafixstar 400	2/DRAM	17/15.8	.26	6X

*Best Buy

ROM unless customers request it. Printed and on-screen documentation is clear and complete. Dell's reliability and service are highly rated by our readers, and the three-year parts and labor warranty, year of free on-site service, and 30-day money-back guarantee all are fine offerings.

We also looked at the similar Dimension XPS 166s this month. While its competitive PC WorldBench score of 202 doesn't push the envelope of Pentium-166 performance, its reasonable $2999 price and outstanding design add up to a terrific value. Its array of components includes the same integrated sound, generous 512K secondary cache, and RAM configuration as its P-200 sibling. Dell configured our XPS 166s with a 6X Teac CD-ROM drive, a fine U.S. Robotics 28.8-kbps modem (which can also connect at 33.6 kbps), a Cirrus Logic GD5424-80QC-C video card with 2MB of VRAM, and a very nice 17-inch monitor. Our one disagreement with the configuration of the XPS 166s is the relatively small 1.08GB hard drive. Most PCs this powerful come with more storage (the top-ranked P-200 has a 2.6GB hard drive, for example), and we suggest you spend a little more and have Dell install a larger drive.

Although the XPS P200s is the only Dimension Pentium we list in our chart, several "c" series units that Dell still has on the market are also worth your consideration. The best of the rest are the $2729 XPS P133c and the $2679 XPS P120c, both priced with 16MB of RAM, 512K of secondary cache, and an Imagine 128 graphics card.

NO. 2: DELL OPTIPLEX GXPRO 200

PROS: Fastest system we've tested, exceptional design, integrated networking

CONS: Very expensive, 4X CD-ROM drive

If you want the fastest PC around, the Dell OptiPlex GXpro 200 is your machine. With its PC WorldBench score of 232, this Pentium Pro-200 is over 10 percent faster than the fastest Pentium-166 we've tested and 5 percent faster than the fastest Pentium-200. It's not cheap, but the $4532 price buys you a well-configured corporate powerhouse—and we're not talking just about its heavy complement of RAM. With an integrated 3Com ethernet adapter, this system comes ready to plug in to your network. Dell also adds a Number Nine Imagine 128 Series 2 graphics card with

		EXPANDABILITY					CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open SIMM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
28.8	integrated Vibra 16	minitower	64	512	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	integrated Vibra 16	desktop	512	256	3	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Creative Labs Vibra 16	minitower	128	512	2	3/1	5	3/1	24	Sat., Sun.	BBS, WWW
–	integrated Vibra 16	minitower	128	512	2	3/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	minitower	128	512	2	3/1	6	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	Ensoniq Soundscape Vivo	tower	128	512	1	2/6	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster AWE32	minitower	128	512	2	1/1	5	3/1	24	Sat., Sun.	BBS, WWW
28.8	Ensoniq Soundscape Vivo PnP	minitower	128	256	0	2/1	3	1/1	15	Sat., Sun.	BBS, Prodigy, WWW
–	–	desktop	192	512	4	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	Ensoniq Soundscape Vivo	minitower	128	512	0	3/2	4	1/1	15	Sat., Sun.	BBS, Prodigy, WWW
28.8	Sound Blaster 16	minitower	128	256	4	2/1	4	1/1	16	Sat.	AOL, BBS, CIS, WWW
–	Creative Labs Vibra 16	minitower	192	512	4	4/1	5	3/3	24	–	BBS, CIS, MSN, WWW
–	Creative Labs Vibra 16	minitower	128	512	4	2/1	5	3/3	11	–	AOL, BBS, CIS, WWW
–	Sound Blaster 32 PnP	desktop	512	512	6	1/1	6	3/3	11	Sat.	BBS, WWW
–	integrated OPTi 82C930	minitower	128	512	2	2/2	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
33.6	Ensoniq Soundscape Vivo	minitower	512	256	2	3/1	4	1/1	11	Sat.	BBS, WWW
28.8	Sound Blaster AWE32	minitower	512	256	2	5/1	2	3/3	9	Sat.	WWW
28.8	Sound Blaster AWE32	minitower	128	512	2	1/0	3	3/3	24	Sat., Sun.	BBS, WWW
28.8	Sound Blaster AWE32	tower	768	512	4	4/3	4	4/4	11	–	BBS, CIS, WWW
28.8	Crystal Lake Series 200	minitower	128	512	2	2/2	3	3/3	24	Sat., Sun.	BBS

4MB of VRAM, and throws in a bright, crisp 17-inch Dell D1728D monitor. Like the number one Dimension XPS P200s, the GXpro uses DIMM memory modules rather than SIMMs. People who work on PCs love these newer modules, as they allow greater flexibility in upgrading and make it easier to add memory without having to remove lower-capacity modules to make room.

The GXpro doesn't pretend to deliver the ultimate multimedia experience—it's a fast machine designed to work well in a LAN-linked corporate environment. The integrated Vibra 16 sound chip and Altec Lansing ACS 31 speakers are fairly plain components. And the 4X CD-ROM drive is slow by today's standards. Ironically, our tests show that a faster drive is more beneficial for business apps than for commercial multimedia and game titles (see "CD-ROM Drives: Behind the Ratings," September).

Dell OptiPlex

The OptiPlex GXpro features a desktop design that's a vast improvement over previous systems. The case is easy to remove, and the internal construction is modular. Cards are housed on a vertical riser plane that slides out at the touch of a lever. Even the power supply swings aside for effortless access to the motherboard and drive bays. And the new design is explained clearly in the system's well-organized manual. Overall, this machine is one of the easiest to upgrade we've seen.

NO. 3: MICRON P200 MILLENNIA

PROS: Priced near the budget level, big hard drive, 8X CD-ROM drive, 3-D graphics card

CONS: No modem

A big $710 price drop since last month moves the $2549 Micron P200 Millennia up a notch in our power desktop rankings. While you get only 16MB of RAM, the hard drive is an ample 2.5GB. And this is not just another low-price PC—the system's sturdy design and good configuration are the main reasons that it ranks among the best Pentium-200 values. As you would expect from a machine with a CPU this powerful, the P200 Millennia is fast: A PC WorldBench score of 210 puts it right in the middle of the Pentium-200 pack, but among the Pentium-200s that ▶

come with just 16MB of RAM installed, it's one of the fastest we've tested.

A terrific component of our test system is the Diamond Stealth 3D 2000 graphics card. The P200 Millennia was the first PC we tested that uses this card, which combines exceptional Windows graphics performance with 3-D acceleration. The Stealth 3D makes this unit a fine choice for people who want to use 3-D in their presentations, Web sites, CAD programs, and games.

Micron P200 Millennia

The P200 Millennia is well designed and easy to use. Its 17-inch Micron monitor is easy on the eyes, and the inexpensive Advent speakers sound quite good. (Micron has some higher-price options for audiophiles.) The minitower case is narrower and taller than most we've seen, but still easy to upgrade. Attached to the bottom is a single foot that widens the base to prevent tipping. The multimedia ports are installed high on the back of the case to make them easier to get to. In addition to offering round-the-clock tech support and a long standard warranty, Micron bundles Microsoft Office Professional, Bookshelf, and the Plus Pack with all its Millennias. ▶

TOP 20 POWER DESKTOPS

PERFORMANCE

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension XPS P200s*	Pentium-200	16	512	208
2	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	232
3	Micron P200 Millennia*	Pentium-200	16	512	210
4	Dell OptiPlex GXMT 5200*	Pentium-200	32	512	216
5	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	211
6	Gateway 2000 P5-200XL	Pentium-200	32	512	208
7	Micron P166 Millennia Plus	Pentium-166	16	512	198
8	Quantex QP6/200 SM-2	Pentium Pro-200	32	256	224
9	IBM PC 350	Pentium-200	32	512	215
10	Quantex QP5/200 SM-2	Pentium-200	32	512	216
11	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	192
12	ZDS Z-Station GT 500	Pentium-200	32	256	215
13	HP Vectra VL Series 4 5/166 MT	Pentium-166	16	256	197
14	Tangent Media Gem	Pentium-200	32	512	220
15	NEC PowerMate P166	Pentium-166	16	256	194
16	Multiwave Ultra Power	Pentium-200	16	256	215
17	Xi Computer Pro 200 MTower SP	Pentium Pro-200	32	256	221
18	Cyrix 6x86-P166+ PC	Cx6xB6-P166+	16	256	199
19	Vektron Optima Pro Station P200	Pentium-200	32	512	217
20	Austin PowerPlus 200	Pentium-200	16	256	201

*Best Buy

Application test times in minutes

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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TRAVELING SOFTWARE

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NO. 4: DELL OPTIPLEX GXMT 5200

PROS: Fast, built-in networking, hot graphics card

CONS: Expensive

The Pentium-200 version of Dell's network-ready OptiPlex GXMT line is a real greyhound. With a PC WorldBench score of 216, it's one of the fastest P-200 systems we've tested. While its less-expensive sibling, the $3877 OptiPlex GXMT 5166, also is a good value, the $4326 OptiPlex GXMT 5200 races right past it to earn a Best Buy.

Dell OptiPlex

The high performance of our test system is helped along by the unit's copious helping of RAM, big secondary cache, and Number Nine Imagine 128 Series 2 graphics board with 4MB of VRAM. While Dell has yet to upgrade all its OptiPlex systems to faster CD-ROM drives, the OptiPlex GXMT 5200 has now taken on an 8X CD-ROM drive to replace the slower quad-speed model it used to come with. The 16-bit integrated Vibra sound and Altec Lansing speakers are decent if not exciting.

The minitower case is sturdy and easy to open, and the 3Com ethernet adapter is integrated, saving you an expansion slot. The expansion slots hover above the motherboard on a daughtercard, so you don't have to worry about system chips getting in the way of longer boards.

As with all its OptiPlexes, Dell backs the GXMT 5200 with a three-year warranty. The company even has a special hot line for the first 30 days to help you set up your PC. From then on, regular hardware tech support is available around the clock.

NO. 5: DELL DIMENSION XPS PRO200N

PROS: Improved new design, big hard drive, powerful and capable graphics card

CONS: Sluggish for a Pentium Pro-200

For a loaded Pentium Pro-200 that's as well built as this one, $3499 is a good deal (and $100 cheaper than last month's price). The Dimension XPS Pro200n has a heavy helping of RAM, a big hard drive, an 8X CD-ROM drive, and a feature-rich Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM and support for full-motion video. Dell also bundles Microsoft Office Professional so you can start working immediately.

Dell XPS Pro200n

The minitower setup—the same as that of the top-ranked Dimension XPS P200s—is a big improvement over previous Dimension designs. For one thing, to help you avoid accidental system shutoffs, it has a sensibly placed on/off button that can't be confused for a floppy eject. And the system's tidy new interior makes it easy to install upgrades.

The performance of this Pentium Pro-200 is a little disappointing. The system's PC WorldBench score of 211 is the lowest of all the Pentium Pro-200s we've tested—just 3 points higher than that of the number one Dimension XPS P200s, which uses a Pentium-200 processor. Still, the XPS Pro200n is a fast, loaded PC that carries a three-year warranty. You can save $199 by buying only a one-year warranty, but you have to ask for it.

New This Month

The following PCs made our Power Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

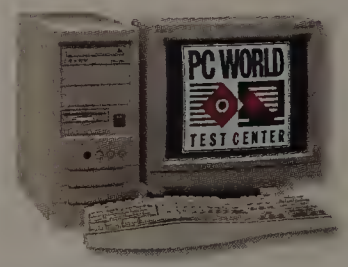
NO. 16: MULTIWAVE ULTRA POWER

PROS: Powerhouse performance, outstanding price, high-quality components

CONS: The one-year parts and labor warranty that is included at this price is fairly short

Any way you slice it, a fast Pentium-200 for just $2520 is quite a find—and this one comes remarkably well equipped. And its very good performance belies its modest price: The Multiwave Ultra Power scored 215 on our PC WorldBench suite—high enough to put it in a league with some of our top power desktops. The configuration is strong too, starting with a 33.6-kbps fax-modem and a pair of large, good-sounding stereo speakers. Throw in the STB Lightspeed 128 PCI video card with 2MB of MDRAM, the crisp 17-inch AcerView 761 monitor, an 8X IDE CD-ROM drive, and a Microsoft ergonomic keyboard, and you have an impressive array of equipment. Granted, the 1.3GB hard drive could be larger, but its smaller size is a relatively minor concession to price.

The layout inside the minitower case is reasonably clean: Despite the drooping cables, the drive bays are well out of the way of the motherboard, and there's plenty of room to add storage devices, expansion cards, and RAM, with four bays (three externally accessible), three PCI slots, one ISA slot, and two SIMM sockets all open.



Multiwave

As is the case with many smaller vendors, Multiwave includes no setup guide to help you get started using your system. The documentation is composed of a motherboard booklet and separate component manuals. These booklets are not badly written, and experienced buyers will be accustomed to this kind of documentation, but neophytes may get a little lost. Support policies are good-to-average, although Multiwave hasn't generated enough fax-back responses from our readers for us to assign a rating to its reliability and service. The 30-day money-back guarantee, year of free on-site service, and toll-free technical support 11 hours per weekday and 6 hours on Saturday are all middling offerings. But the one-year parts and labor warranty included at this price is short. ▶

Beyond the Top 20

We tested these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Acma zPower Series P200**
- **Amax Pentium Power Station P-200**
- **Digital Venturis FX 5133 Low Profile**
- **DirectWave Blue Thunder Cx 166 MVP Pro**
- **Netis N5166 Power Station**
- **SAG STF 2000 Power System**
- **Total Peripherals Workhorse 166**

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (7/18/96)	CPU	Comments
1	Micron P133 Millennia 800/223-6571 www.micron.com	4	Mar 96	$2049	Pentium-133	$300 drop takes it to the top; P-100, -120, -150, and -166 also good values.
2	Dell OptiPlex GXM 5100 800/613-3355 www.dell.com	2	Aug 96	$2213	Pentium-100	Good for budget-conscious buyers who want a well-built PC with networking.
3	Gateway 2000 P5-120 800/846-2000 www.gw2K.com	3	Mar 96	$1799	Pentium-120	No sound but still the best budget Gateway. P-133 and P-166 also fine values.
4	Quantex QP5/100 M-3 800/896-4898 www.quantex.com	5	Mar 96	$1799	Pentium-100	Great value with upgraded tech support; reliability still a problem.
5	Vektron Multimedia P-100 800/725-0026 www.vektron.com	17	Mar 96	$1595	Pentium-100	Price is down $300 this month on loaded multimedia PC.
6	Gateway 2000 P5-166 800/846-2000 www.gw2K.com	–	new	$2444	Pentium-166	Fastest P-166 tested has Office 95 Pro, big monitor; sound, modem cost extra.
7	Caliber Voyager P200 510/353-1220 www.calibercorp.com	–	Sept 96	$1829	Pentium-200	$370 price drop puts first P-200 on Budget chart, and it has full multimedia.
8	Acma zPower 166V 800/786-6888 www.acma.com	15	Sept 96	$2095	Pentium-166	Fast P-166 multimedia system is a great deal and includes PC Card slots.
9	USA Flex Family Special 800/872-3539 www.usaflex.com	11	July 96	$1999	Pentium-133	$150 price drop boosts decked-out PC; documentation is sparse.
10	ProGen Atlas P-150 800/848-8777 www.progen.com	–	new	$1880	Pentium-150	Only P-150 on chart has nice software bundle, very good performance.
11	Digital Venturis 575 800/722-9332 www.digital.com	–	Mar 96	$1625	Pentium-75	A little pricey for a P-75; makes the chart by means of a $286 price drop.
12	Robotech Cobra XLT P-133 800/255-2215 www.robotechusa.com	20	July 96	$1899	Pentium-133	Fast, reasonably priced; spotty documentation, weak support.
13	Micro Express MicroFlex-686/P120+ 800/989-9900 www.wpages.com/microexpress/	9	Aug 96	$1399	Cx6x86-P120+	Dirt-cheap PC with P-120-type power, but getting support can be difficult.
14	Xi Computer P133MTower SP 800/432-0486 www.win.net/xi_comp	13	Mar 96	$1969	Pentium-133	Great performance, $130 price drop, very expandable; tech support is limited.
15	Blackship P150 CyriMedia 6x86 800/531-7447 www.blackship-computers.com	–	Sept 96	$1695	Cx6x86-P150+	Performs like a P-166 and comes with a lot; pretty bland.
16	NEC PowerMate V100 800/632-4636 www.nec.com	10	Aug 96	$2230	Pentium-100	Solid value system with nice design, but graphics system is weak.
17	SAG Electronics STC Ultra Cyrix 6x86 P166+ 800/989-3475	–	new	$2003	Cx6x86-P166+	Plenty of speed, great video card, good-quality monitor, and full multimedia.
18	DirectWave Blue Thunder P133 MVP Pro 800/840-1889 www.directwave.com	–	new	$2049	Pentium-133	Very fast for a P-133, wavetable sound, 17-inch monitor, and fast modem.
19	Austin PowerPlus 100 800/752-1577 www.austindirect.com	–	Mar 96	$1839	Pentium-100	Solid budget system, but reliability and service hard to gauge.
20	Diamond DT-100 800/989-7253 www.diamondtech.com	–	Mar 96	$1235	Pentium-100	$114 drop puts it on chart; small monitor and 1MB of graphics DRAM.

Best Buy See features chart, page 210; performance chart, page 212. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available September 24). You can also order a previous month's Top 20 chart with capsule reviews plus features and performance charts ($4.50) and individual capsule reviews with features and performance charts ($1.50 each). Prices effective for the U.S. and Canada. Foreign orders are $15 for

DELL'S DISCONTINUATION of its top Pentium-100, the Dimension P100t, is a harbinger: P-133s are becoming the new low-end PC. Micron's P133 Millennia takes over as number one this month, and as the Caliber Voyager P200 shows, now you can even find budget-price P-200s. A P-133 too slow to make our chart this month, the AST Advantage 824, has a great home software bundle, a good $1999 price, and round-the-clock tech support. The $2112 HP Vectra XM Series 4 5/120, another also-ran from a major vendor, is expensive for a P-120 with a so-so 15-inch monitor and no CD-ROM drive, sound, or speakers. For reviews of all the new non–Top 20 PCs, see PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

Overall rating	PC World-Bench score	Price	Vendor's system reliability	Features and design	Performance	Vendor's service and support	Reader service number	Fax reprint number [1]
85	182	average	good	outstanding	very good	fair	660	3268
84	170	average	good	very good	good	best	661	3409
83	176	average	fair	very good	good	good	662	3392
80	167	average	poor	outstanding	good	fair	663	3353
78	171	inexpensive	[2]	very good	good	[2]	664	3325
78	201	expensive	fair	very good	very good	good	665	3433
78	189	inexpensive	[2]	very good	very good	[2]	666	3434
78	199	average	[2]	outstanding	very good	[2]	667	3429
77	181	average	poor [3]	very good	very good	fair [3]	668	3426
77	184	average	[2]	very good	very good	[2]	669	3435
77	100	inexpensive	good	good	satisfactory	fair	670	3436
77	189	average	poor [3]	outstanding	very good	worst [3]	671	3393
77	175	very inexpensive	poor	good	good	worst	672	3411
77	193	average	[2]	very good	very good	[2]	673	3398
77	196	inexpensive	[2]	good	very good	[2]	674	3437
77	163	average	fair	very good	good	fair [3]	675	3413
76	202	average	[2]	very good	very good	[2]	676	3438
76	194	average	[2]	outstanding	very good	[2]	677	3439
76	147	average	[2]	very good	good	[2]	678	3440
76	156	very inexpensive	poor [3]	good	good	worst [3]	679	3441
Percentage of overall rating:		Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent		

advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews. [2] Insufficient data.
[3] Limited data; score is based on responses for this company and average of all companies.
FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 905.

This Month's Best Buys

NO. 1: MICRON P133 MILLENNIA

PROS: Fast, loaded with useful features

CONS: Reports of DOA components have risen

In just two months this compact PC's price has dropped an amazing $600, to just $2049. Micron's P133 Millennia has moved up three places this month to become our new number one, replacing the discontinued Dell Dimension P100t. This same P133 Millennia was a Best Buy on our Power Desktops chart for months. It's loaded with memory, secondary cache, and hard disk space, as well as a full complement of multimedia features. Its PC WorldBench score of 182 is among the upper echelons of budget desktop performance.

The interior is well laid out, and SIMM sockets are particularly accessible. Micron's on-screen documentation is helpful, with basic maintenance tasks illustrated. Readers still rate Micron reliability as good and service as fair, though the number of fax-back responses reporting DOA components has risen recently for Micron.

Micron P133 Millennia

Price drops on other Millennias we've tested keep them in contention. The P166 (reviewed in April) now goes for $2249; the P150 (reviewed in May) sells for $2149. The P120 and P100 (both reviewed in March) now cost less than $2000. These inexpensive systems are all priced with 15-inch monitors.

NO. 2: DELL OPTIPLEX GXM 5100

PROS: Fast, well designed, built-in networking

CONS: No application software

The $2213 OptiPlex GXM 5100 is aimed at the business PC buyer who wants built-in networking in a budget-price corporate-style system. And with a PC WorldBench score of 170, it's quite fast for its price and CPU class.

The graphics controller—which has the capability to accelerate full-motion video—is integrated on the motherboard along with a 16-bit sound chip. And this desktop has some room for expansion, including five open slots (two of which are shared PCI/ISA slots) and one drive bay. Upgrading is a snap, thanks to an easy-open case and clean interior.

Dell OptiPlex

If you're a do-it-yourselfer, the OptiPlex GXM 5100's documentation is detailed, thorough, and easy to read and understand. The strong three-year warranty is paired with service and reliability that consistently rate very highly with readers responding to our ongoing fax-back polls. About the only thing lacking is some application software to get you up and running. ▶

TOP 20 BUDGET DESKTOPS

STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Micron P133 Millennia*	Pentium-133	16	512	2.1	Diamond Stealth64 Video VRAM	2/VRAM	15/13.6	.28	8X
2	Dell OptiPlex GXM 5100*	Pentium-100	16	256	1.1	integrated Trio64V+	2/EDO DRAM	15/13.5	.28	4X
3	Gateway 2000 P5-120*	Pentium-120	16	256	1.6	ATI Mach 64	2/DRAM	15/14	.26	8X
4	Quantex QP5/100 M-3*	Pentium-100	16	256	1.6	STB Powergraph 64 Video	2/EDO DRAM	15/14	.28	8X
5	Vektron Multimedia P-100*	Pentium-100	16	256	2.1	Diamond Stealth64	2/DRAM	15/14.1	.25	6X
6	Gateway 2000 P5-166	Pentium-166	16	256	2.5	STB Lightspeed 128	2/MDRAM	17/15.6	.25	8X
7	Caliber Voyager P200	Pentium-200	16	256	1.6	Diamond Stealth64 Video 2001	2/EDO DRAM	15/13.8	.28	6X
8	Acma zPower 166V	Pentium-166	16	256	1.3	Diamond Stealth64 Video 2001	2/EDO DRAM	15/13.7	.28	6X
9	USA Flex Family Special	Pentium-133	16	256	1.3	STB Powergraph 64 Video	2/EDO DRAM	15/13.7	.27	8X
10	ProGen Atlas P-150	Pentium-150	16	256	1.3	ATI Mach 64	2/DRAM	15/14.3	.28	8X
11	Digital Venturis 575	Pentium-75	8	256	0.9	integrated Trio64	1/DRAM	15/13.5	.28	4X
12	Robotech Cobra XLT P-133	Pentium-133	16	256	1.3	Number Nine 9FX Motion 331	2/EDO DRAM	17/15.4	.28	6X
13	Micro Express MicroFlex-686/P120+	Cx6x86-P120+	16	256	1.3	STB Powergraph 64 Video	2/DRAM	15/14.1	.28	8X
14	Xi Computer P133MTower SP	Pentium-133	16	512	1.3	Diamond Stealth64 Video VRAM	2/VRAM	17/15.6	.26	6X
15	Blackship P150 CyriMedia 6x86	Cx6x86-P150+	16	512	1.3	Matrox MGA Millennium	2/WRAM	15/13.5	.28	6X
16	NEC PowerMate V100	Pentium-100	16	256	1.6	Alliance ProMotion 6422	2/DRAM	15/13.5	.28	6X
17	SAG STC Ultra Cyrix 6x86 P166+	Cx6x86-P166+	16	512	2.1	Matrox MGA Millennium	2/WRAM	15/14.1	.28	6X
18	DirectWave BlueThunder P133 MVP Pro	Pentium-133	16	512	1.3	Diamond Stealth 3D 200 Series	2/EDO DRAM	17/16.1	.26	8X
19	Austin PowerPlus 100	Pentium-100	16	256	0.9	ATI Mach 64	2/VRAM	15/13.6	.28	6X
20	Diamond DT-100	Pentium-100	16	256	1.3	Paradise Bahamas 64	1/DRAM	14/13.6	.28	8X

*Best Buy

NO. 3: GATEWAY 2000 P5-120

PROS: Good performance, 8X CD-ROM drive, Microsoft Office Professional Edition

CONS: No sound, speakers, or modem

Gateway's sturdy P5-120 desktop stalwart continues to rank among the best budget PCs we've seen. The $1799 system is a great deal from a well-known company, but—as with some of the other budget desktop machines—it doesn't include all the components often considered standard in today's desktops. For example, you'll need to pay another $99 if you want to get a sound card and speakers, and if surfing the Web is on your agenda, a 28.8-kbps internal fax-modem will cost you another $149.

Gateway 2000

The P5-120 is quite fast for a Pentium-120 system. Its PC WorldBench score of 176 not only is above average for a P-120, but also is high for a system in this price range. If you can spend an extra $90, the P5-133 version we also tested will give you a 6 percent performance boost in the same configuration.

NO. 4: QUANTEX QP5/100 M-3

PROS: Good performance, full multimedia, 28.8-kbps fax-modem, 8X CD-ROM drive

CONS: Poor reliability rating

The $1799 QP5/100 M-3 is an eminently affordable family-oriented multimedia system that comes with a bunch of games, PerfectWorks integrated software, and several online start-up kits. It's a good choice for home offices, especially ones in which the computer is put into general use for entertainment, homework, and the Web. Features like 16MB of RAM, a 1.6GB hard drive, an 8X CD-ROM drive, and a fast 28.8-kbps fax-modem with voice mail earn this minitower a Best Buy.

Quantex

If you want more power, the $2299 QP5/133 SM-2 (reviewed in July) is a faster alternative that still makes the budget cut. It's priced with a bigger 2GB hard drive and a 17-inch monitor. Like its P-100 sibling, it also comes with multimedia hardware and a 28.8-kbps fax-modem.

Quantex gets a lukewarm response from

		EXPANDABILITY					CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open SIMM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
–	Creative Labs Vibra 16	compact	128	512	2	2/1	5	3/1	24	Sat., Sun.	BBS, WWW
–	integrated Vibra 16	desktop	128	512	2	1/0	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	compact	128	256	2	2/0	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	WillowPond K130 Pro Mad	minitower	128	512	2	2/1	4	1/1	15	Sat., Sun.	BBS, Prodigy, WWW
14.4	Creative Labs Vibra 16	minitower	128	256	2	2/0	5	1/1	11	–	BBS, CIS, WWW
–	–	minitower	128	512	2	2/2	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16	minitower	256	512	2	2/1	4	2/1	9.5	–	BBS, WWW
28.8	Sound Blaster 16	minitower	128	512	2	2/1	3	3/1	9.5	–	BBS, WWW
28.8	proprietary 16-bit	minitower	128	512	2	3/1	4	3/3	24	Sat., Sun.	–
28.8	Sound Blaster 16 PnP	minitower	128	256	2	3/0	3	3/3	11	–	BBS
–	–	desktop	128	256	2	1/0	4	3/3	24	–	BBS, WWW
28.8	Sound Blaster 16	minitower	128	512	2	3/3	4	3/1	9	–	BBS, WWW
–	SP301 ESS16BB Audio Drive	minitower	128	512	4	3/1	6	2/2	9.5	Sat., Sun.	WWW
–	Creative Labs Vibra 16	tower	128	512	2	5/2	6	3/3	9	Sat.	WWW
28.8	SP301 ESS16BB Audio Drive	tower	128	512	2	3/1	4	3/1	10	–	AOL, BBS, CIS, Prodigy, WWW
–	integrated OPTi 930A	minitower	128	256	2	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
–	Sound Blaster 16	minitower	512	512	6	3/2	6	2/2	10	–	BBS
28.8	Sound Blaster AWE32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
28.8	Creative Labs Vibra 16	minitower	128	256	2	3/2	3	1/1	24	Sat., Sun.	–
–	–	minitower	128	512	2	3/0	4	1/1	9	–	BBS

readers for its reliability and service, but the company says it's taken strides to remedy the situation; technical support hours have been extended and personnel added.

NO. 5: VEKTRON MULTIMEDIA P-100

PROS: Fast for a P-100, great price, big hard drive

CONS: Slim data on reliability and service, no weekend tech support

This speedy Pentium-100–based minitower delivers a lot of value for its low $1595 price. It comes with full multimedia, including a 6X CD-ROM drive and a Creative Labs Vibra 16 sound card. More impressive in a bargain system is the big 2.1GB hard drive. At this price, it's a plus that Vektron provides a fax-modem at all, but Web surfers will want to pay a little more and get a 28.8-kbps model rather than the slower 14.4-kbps unit that's included. Your major compromise if you buy this system instead of one of the higher-ranked Best Buys will be doing without the guidance of a track record on reliability and service, as too few Vektron customers have given input via our ongoing fax-back survey for us to rate the company. Vektron's toll-free technical support is available for only 11 hours per weekday, with no support on weekends. And the price listed covers the system parts and labor for just one year.

Vektron

New This Month

The following PCs made our Budget Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

NO. 6: GATEWAY 2000 P5-166

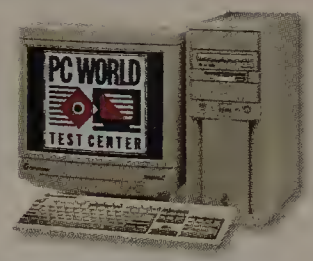
PROS: Fast, big hard drive, fine monitor, 8X CD-ROM drive, easy to upgrade

CONS: No sound card or speakers at this price, awkward keyboard

If you can shop at the high end of the budget range, the Gateway P5-166 should be right up your alley. In fact, this handsome $2444 Pentium-166 minitower just missed being a Best Buy this month. With a PC WorldBench rating of 201, the P5-166 is a super budget performer, and ▶

it includes perks befitting a power system, such as a 2.5GB hard drive, an 8X CD-ROM drive, a 2MB STB Lightspeed 128 video card, and an eye-pleasing 17-inch Gateway Vivitron monitor. To sweeten the deal, Gateway throws in Microsoft Office 95 Professional. But you'll have to pay an extra $149 for a 28.8-kbps modem and another $90 for a 16-bit Sound Blaster card and Altec Lansing ACS-40 speakers.

A lot of thought went into the design. The system is well ventilated, and the layout is clean, with plenty of room to add memory, cards, and drives.



Gateway P5-166

The ports on the back of the system are labeled clearly, and the keyboard's quality is good, although the half-size <Backspace> key is hard to use without hitting the <Backslash> key. The well-illustrated documentation comes complete with handy start-up guides. Much of the peripherals documentation is in individual booklets, but it's detailed and complete. Gateway provides a warranty covering parts for three years (with the first year on site) and labor for one. Readers rate Gateway's reliability as fair and service as good. Toll-free technical support is available around the clock. ▶

TOP 20 BUDGET DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Micron P133 Millennia*	Pentium-133	16	512	182
2	Dell OptiPlex GXM 5100*	Pentium-100	16	256	170
3	Gateway 2000 P5-120*	Pentium-120	16	256	176
4	Quantex QP5/100 M-3*	Pentium-100	16	256	167
5	Vektron Multimedia P-100*	Pentium-100	16	256	171
6	Gateway 2000 P5-166	Pentium-166	16	256	201
7	Caliber Voyager P200	Pentium-200	16	256	189
8	Acma zPower 166V	Pentium-166	16	256	199
9	USA Flex Family Special	Pentium-133	16	256	181
10	ProGen Atlas P-150	Pentium-150	16	256	184
11	Digital Venturis 575	Pentium-75	8	256	100
12	Robotech Cobra XLT P-133	Pentium-133	16	256	189
13	Micro Express MicroFlex-686/P120+	Cx6x86-P120+	16	256	175
14	Xi Computer P133MTower SP	Pentium-133	16	512	193
15	Blackship P150 CyriMedia 6x86	Cx6x86-P150+	16	512	196
16	NEC PowerMate V100	Pentium-100	16	256	163
17	SAG STC Ultra Cyrix 6x86 P166+	Cx6x86-P166+	16	512	202
18	DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	194
19	Austin PowerPlus 100	Pentium-100	16	256	147
20	Diamond DT-100	Pentium-100	16	256	156

*Best Buy

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows
Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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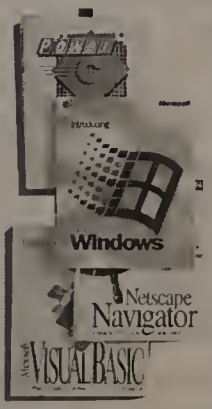

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NO. 10: PROGEN ATLAS P-150

PROS: Very good performance, inexpensive

CONS: Company's reliability record is unknown

ProGen has just what many buyers need: a fast, well-configured minitower with a high PC WorldBench score of 184 and a low $1880 price. The 1.3GB hard disk is nothing special, but the fast GoldStar 8X CD-ROM drive was a Best Buy in last month's review of CD-ROM drives. ProGen also throws in wavetable sound and a 28.8-kbps fax-modem, and matches a 2MB ATI Mach 64 video card with a nice 15-inch MAG DX1595 monitor.

ProGen Atlas P-150

Access to the inside is easy. Rather than pulling off the whole outer case, you simply remove a couple of screws and take off a side panel. There's plenty of room for adding memory, cards, and drives.

ProGen's home software bundle is generous, including the 1996 Grolier's Multimedia Encyclopedia, a Win 95 training program, and Software Jukebox with the Links golf game and a jet fighter simulation. But the system's documentation is presented in a confusion of individual booklets covering the many components.

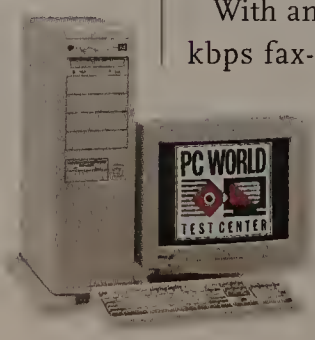
The Atlas features a three-year warranty on parts and labor and a year of free on-site service, but toll-free technical support is available just 11 hours per weekday, and there are no weekend hours at all. ProGen is a small company, and it hasn't engendered the fax-back response we need to give you a report on the firm's reliability and service.

NO. 17: SAG STC ULTRA CYRIX 6X86 P166+

PROS: Fast, inexpensive, nice graphics subsystem

CONS: No weekend technical support

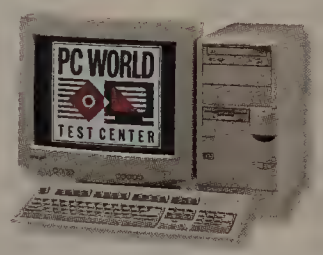
The SAG STC Ultra Cyrix 6x86 P166+ is the kind of fast, full-featured PC that can serve the needs of both home and business. Priced at a mere $2003, this Cyrix 6x86-P166+ system delivers a strong PC WorldBench score of 202.



SAG Ultra Cyrix

If SAG cut corners to sell the Ultra at such a reasonable price, it's news to us. The graphics adapter is fast, the monitor is sharp, the 2.1GB hard drive is spacious, and the keyboard's built-in speakers produce good 3-D sound. And the Matrox MGA Millennium video card (a former *PC World* Best Buy) is fast and capable. It packs 2MB of WRAM, which is more than enough to show 16-bit color on the 15-inch MAG DX1595 monitor.

The motherboard even features a second processor socket, so if you decide to move up to Windows NT, you can add a second CPU. It's housed in a sturdy minitower case with a clean, uncluttered interior.



DirectWave

The documentation for our review system was composed of well-written component manuals. SAG's warranty covers parts and labor for two years. And the company also provides toll-free technical support—but only on weekdays. We don't have enough fax-back responses from our readers to be able to rate SAG's reliability and service.

NO. 18: DIRECTWAVE BLUE THUNDER P133 MVP PRO

PROS: Fast, fine warranty, large monitor

CONS: Confusing manuals, tiny <Backspace> key

The DirectWave Blue Thunder P133 MVP Pro is about as fast as an average P-166, and it has most of the features you would have found on a typical Top 20 power desktop just six months ago. But for budget shoppers, price is most important. And $2049 is a good price for a minitower system with an impressive PC WorldBench score of 194 and a big, high-quality 17-inch monitor—a nice MAG DX1795. To match the fine display, the company includes a Diamond Stealth 3D 200 graphics board with 2MB of EDO DRAM.

With an 8X CD-ROM drive and 28.8-kbps fax-modem, this system doesn't compromise. Audiophiles will be happy with the Sound Blaster AWE32 wavetable sound card, microphone, and pair of ear-pleasing SK-A30 Multimedia Speakers. And action-game aficionados will like the SkyHawk QuickShot joystick.

DirectWave added some nice touches. For example, the turquoise power button contrasts nicely with the cream-colored case, making it easy to spot and use. The ports on the back of the system are all well labeled—including the monitor connector and the ports on the sound card.

This machine is not flawless. We ran into a number of problems, although few of them took us above the level of annoyance. The keyboard is lightweight but sturdy; however, reviewers with short fingers had to make an uncomfortable stretch to avoid hitting the backslash when reaching for the tiny <Backspace> key. We would have appreciated a better internal layout. Cable clutter is minimal, but the two open SIMM sockets are so close to the power supply that it makes them awkward to access. And only one of the ISA slots will take a full-length card. Expandability is adequate.

The documentation could have been better. Dealing with individual booklets for each of the major components doesn't usually trouble experienced users. But DirectWave included the wrong motherboard manual with our system.

It's hard to find fault with DirectWave's three-year warranty on parts and labor or the year of free on-site service. Toll-free tech support is available 11 hours each weekday and 7 hours on Saturday. However, DirectWave has yet to make a blip on our fax-back radar screen: We need more survey responses from owners of DirectWave systems. From the limited number of anonymous technical support calls we've made ourselves, we've gotten uneven results, with some correct answers and some erroneous responses. ▶

Beyond the Top 20

We tested these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Altura P100**
- **AST Advantage 824**
- **HP Vectra XM Series 4 5/120**
- **Nexar 9000**

Click	Click
<Esc> @10,20	Click
Click	Click
Click <Esc>	Click
#@!? Redraw	Click
Click <Tab>	
<Tab> 14.3	
Click <Esc>	
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Crash #@!?	

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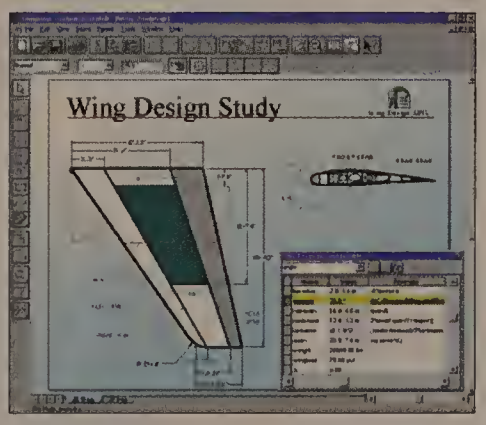

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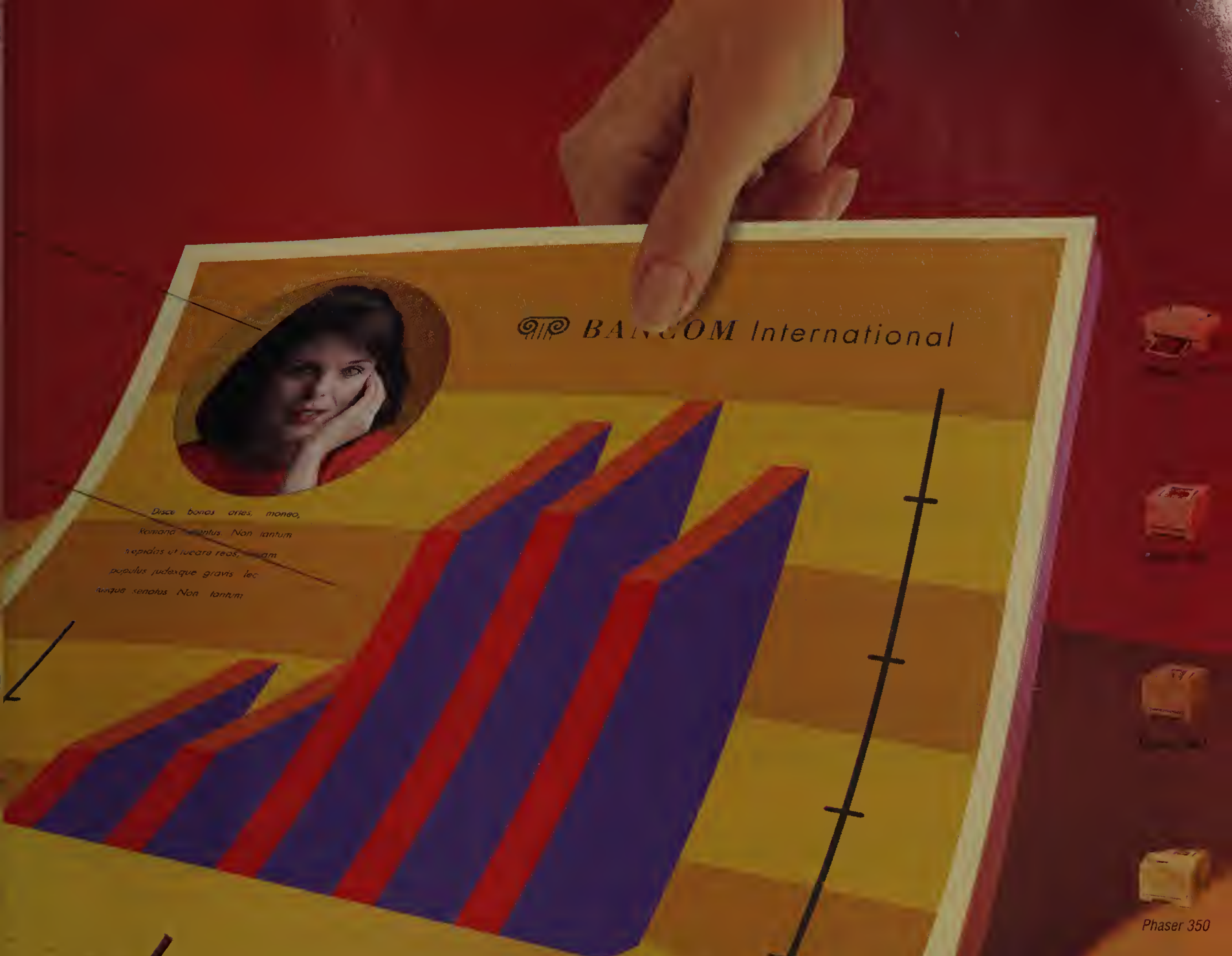
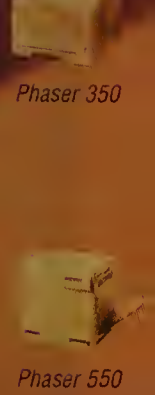


Breakthrough price.



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PCWORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (7/18/96)	CPU	Comments
1	Dell Latitude LM P133ST 800/613-3355 www.dell.com	–	new	$3999	Pentium-133	Fastest notebook we've ever tested also has good battery life.
2	Dell Latitude XPi P133ST 800/613-3355 www.dell.com	2	Aug 96	$4649	Pentium-133	Fast, well-designed notebook priced with 24M8 of RAM; no CD-ROM option.
3	Toshiba Satellite Pro 420CDS 800/457-7777 www.toshiba.com	1	Sept 96	$3298	Pentium-100	Powerful multimedia in an economical design that's sturdy and comfortable.
4	Toshiba Tecra 720CDT 800/457-7777 www.toshiba.com	3	Sept 96	$6299	Pentium-133	Cutting-edge features, 6X CD-ROM drive, 4.3-hour battery life; heavy.
5	Toshiba Portégé 610CT 800/457-7777 www.toshiba.com	4	Mar 96	$3199	Pentium-90	Few subnotes make the grade, but this one's comfortable; nice screen, sound, video.
6	Gateway 2000 S5-100XL 800/846-2000 www.gw2k.com	–	new	$3349	Pentium-100	Classy and fast, fine keyboard and pointing device; fair reliability, service ratings.
7	WinBook XP5 P120 800/468-2162	5	Apr 96	$3499	Pentium-120	Good deal, comfortable keyboard, outstanding battery life; troubling reliability score.
8	IBM ThinkPad 760E 800/772-2227 www.ibm.com	6	Sept 96	$6344	Pentium-133	Ultrafast notebook has great features, but high price and so-so battery life.
9	AST Ascentia J30 800/876-4278 www.ast.com	9	July 96	$2999	Pentium-100	Attractive design, very good battery life, light weight; faster with more RAM.
10	Dell Latitude LM P100SD 800/613-3355 www.dell.com	–	new	$3299	Pentium-100	$700 less than number one, good battery life; better performance with more RAM.
	BUDGET NOTEBOOKS					
1	Toshiba Satellite 100CS 800/457-7777 www.toshiba.com	1	June 96	$1799	Pentium-75	Inexpensive, no-frills Pentium notebook that's easy to use.
2	NEC Versa 550D 800/632-4636 www.nec.com	2	Aug 96	$1699	Cx5x86-100	Sleek, sturdy design with crisp display; you sacrifice performance for price.
3	Sharp PC 3020 800/237-4277	4	June 96	$1699	Cx5x86-100	Low-cost alternative to P-75 notebooks features good battery life, good screen.
4	WinBook XP5 P75 800/468-2162	5	Aug 96	$1999	Pentium-75	Good performance with 8MB of RAM; 14.4-kbps fax-modem; troubling reliability.
5	Hitachi C-090 D 800/555-6820 www.hitachipc.com	–	new	$2199	Pentium-90	Hitachi's first notebook is affordable, has a five-year warranty, too.
6	AcerNote Light 356 800/733-2237 www.acer.com	7	Sept 96	$2199	Pentium-100	Good price for a light, comfortable P-100 notebook; screen is disappointing.
7	Digital HiNote VP 800/642-4532 www.digital.com	6	Sept 96	$2499	Pentium-100	Delivers great speed for the money and features bright dual-scan screen.
8	Sceptre SoundX 3200 800/788-2878 www.sceptretech.com	–	new	$2750	Pentium-100	Fast for a P-100 notebook, but touchpad is jumpy; no weekend tech support.
9	Austin Edge XP P100 800/952-9816 www.austindirect.com	8	Sept 96	$2447	Pentium-100	Lightweight speedster has super screen; slim design with cramped keyboard.
10	Broadax NP8662D 800/872-4547	–	Aug 96	$2330	Pentium-120	$220 price drop lifts speedy P-120 onto chart; undistinguished support policies.

Best Buy See features chart, page 220; performance chart, page 222.

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available September 24). You can also order a previous month's Top 20 chart with capsule reviews plus features and performance charts ($4.50) and individual capsule reviews with features and performance charts ($1.50 each). Prices effective for the U.S. and Canada. Foreign orders are $15 for

SPEED IS THE ORDER OF THE DAY on our Power chart, where the new Dell Latitude LM P133ST can give you the performance you'd expect from a P-133 *desktop*. On the budget side, bargains from Toshiba and NEC remain on top. Nearly a Best Buy last month, the IBM ThinkPad 365CS is now gone and will be replaced by the ThinkPad 365e (see review next month). Look for details on the Canon Inno-va Book 475CDT and NoteJet IIICX, HP OmniBook 5500CT, Hitachi M-120T, IBM ThinkPad 356XD, Sharp PC 9030, and others that didn't make the chart, on PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

Overall rating	PC WorldBench score	Performance	Price	Vendor's system reliability	Features and design	Vendor's service and support	Battery life (hours:min)	Battery life	Traveling weight	Reader service number	Fax reprint number [1]
88	180	outstanding	average	good	very good	good [2]	4:32	good	heavy	680	3779
88	166	very good	expensive	good	very good	good [2]	5:20	very good	average	681	3764
87	142	good	average	best	good	good	4:02	good	heavy	682	3771
86	160	very good	very expensive	best	outstanding	good	4:23	good	very heavy	683	3772
84	99	satisfactory	inexpensive	best	good	good	5:09	very good	light	684	3752
83	147	very good	average	fair	good	fair	4:46	good	light	685	3780
82	145	very good	average	poor	good	good	6:19	outstanding	average	686	3736
82	177	outstanding	very expensive	fair	very good	good	2:02	satisfactory	average	—	3773
82	117	good	inexpensive	fair	good	good [2]	5:12	very good	light	688	3259
81	101	satisfactory	average	good	good	good	4:42	good	average	689	3781
▲ Percentage of overall rating for power notebooks:		Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent		Weight 8 percent		
85	86	good	inexpensive	best	satisfactory	good	3:35	good	average	690	3754
78	75	satisfactory	inexpensive	fair	satisfactory	fair	2:59	good	average	691	3767
77	79	satisfactory	inexpensive	[3]	satisfactory	[3]	4:28	good	average	692	3757
76	91	good	average	poor	good	good	4:05	good	average	693	3768
76	88	good	average	[3]	good	[3]	3:43	good	light	694	3782
76	118	good	average	[3]	good	[3]	2:57	good	light	695	3777
76	139	very good	expensive	[3]	good	[3]	3:36	good	light	696	3776
74	149	outstanding	very expensive	[3]	good	[3]	3:31	good	light	697	3783
74	132	very good	expensive	[3]	satisfactory	[3]	3:27	good	light	698	3778
72	141	outstanding	average	[3]	good	[3]	2:10	satisfactory	heavy	699	3784
▲ Percentage of overall rating for budget notebooks:		Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent		Weight 8 percent		

advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews. [2] Limited data; score is based on responses for this company and average of all companies. [3] Insufficient data.
FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 906.

POWER NOTEBOOKS

This Month's Best Buys

NO. 1: DELL LATITUDE LM P133ST

PROS: Large, crisp screen; terrifically fast

CONS: None

The Dell Latitude LM P133ST is a hands-down Best Buy for users looking for a desktop replacement. This $3999 Pentium-133 notebook scored an amazing 180 on our PC WorldBench test—placing it smack-dab in the middle of performance results for P-133 *desktops*. The 12.1-inch active-matrix color screen is vivid and spacious, with a viewable area close to what you get with a standard 14-inch desktop monitor.

In our test, the Dell managed to wring 4.5 hours per charge out of its lithium ion battery. The traveling weight of 8.8 pounds, while heavy, isn't bad for a multimedia notebook: As with most genuine power notes these days, the unit comes with both a floppy drive and a CD-ROM drive you can swap in and out. The Latitude LM P133ST comes with 16-bit onboard sound and good integrated ▶

TOP 20 NOTEBOOK PCs

STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds) [1]	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude LM P133ST*	Pentium-133	8.8	16	810	active	12.1	800 x 600	256	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
3	Toshiba Satellite Pro 420CDS	Pentium-100	8.8	16	772	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
4	Toshiba Tecra 720CDT	Pentium-133	10.6	16	1130	active	12.1	1024 x 768	16.8 million	lithium ion	eraserhead
5	Toshiba Portégé 610CT	Pentium-90	6.4	8	720	active	9.5	640 x 480	65,536	lithium ion	eraserhead
6	Gateway 2000 S5-100XL	Pentium-100	6.8	16	810	active	11.3	800 x 600	256	lithium ion	touchpad
7	WinBook XP5 P120	Pentium-120	7.4	16	1295	active	10.3	640 x 480	65,536	lithium ion	eraserhead, touchpad
8	IBM ThinkPad 760E	Pentium-133	7.8	24	1080	active	12.1	800 x 600	65,536	lithium ion	eraserhead
9	AST Ascentia J30	Pentium-100	6.6	8	810	active	10.4	800 x 600	65,536	lithium ion	eraserhead
10	Dell Latitude LM P100SD	Pentium-100	8.2	8	810	dual-scan	11.3	800 x 600	256	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	Toshiba Satellite 100CS*	Pentium-75	7.6	8	540	dual-scan	10.4	640 x 480	256	NiMH	eraserhead
2	NEC Versa 550D*	Cx5x86-100	7.4	8	540	dual-scan	10.4	640 x 480	256	NiMH	trackball
3	Sharp PC 3020	Cx5x86-100	7.2	8	500	dual-scan	10.4	640 x 480	256	NiMH	touchpad
4	WinBook XP5 P75	Pentium-75	7.4	8	540	dual-scan	10.4	640 x 480	256	lithium ion	eraserhead
5	Hitachi C-090 D	Pentium-90	6.6	8	720	dual-scan	11.3	800 x 600	256	lithium ion	eraserhead
6	AcerNote Light 356	Pentium-100	6.8	16	810	dual-scan	10.4	640 x 480	65,536	NiMH	touchpad
7	Digital HiNote VP	Pentium-100	6.8	16	810	dual-scan	10.4	800 x 600	256	NiMH	touchpad
8	Sceptre SoundX 3200	Pentium-100	7	16	814	active	10.4	800 x 600	256	NiMH	touchpad
9	Austin Edge XP P100	Pentium-100	6.8	16	814	dual-scan	10.4	640 x 480	256	NiMH	eraserhead
10	Broadax NP8662D	Pentium-120	9.6	16	810	dual-scan	11.3	800 x 600	256	NiMH	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] Toll call.

stereo speakers, but a 28.8-kbps PC Card fax-modem costs $259 extra.

The Latitude's design is classy and uncluttered, and the unit is very sturdy. The keyboard is well laid out, with large, full-travel keys. The only compromise is the <F1> through <F12> function keys, which are whittled down to about half the size of the other keys. The touchpad is smooth and responsive, allowing you to click with either the buttons or the touchpad itself.

Dell's service and reliability are dependable, according to our reader fax-back surveys. And the policies are strong, including a three-year warranty on parts and one year on labor, a two-day factory repair turnaround policy, and 24-hour toll-free technical support. The documentation, both on-screen and printed, is thorough and well written.

Dell Latitude LM

NO. 2: DELL LATITUDE XPI P133ST

PROS: Fast, very good battery life

CONS: No internal CD-ROM drive option, cramped keyboard, somewhat imprecise trackball

With a $450 price drop to $4649 this month, the XPi P133ST hangs on to its Best Buy ranking. This system's PC WorldBench score of 166 doesn't match the number one Latitude's 180. But the XPi is still a very quick P-133 notebook. It's also easy to carry on the road, thanks to its 7.2-pound traveling weight and very good 5.3-hour battery life. The XPi's NeoMagic video chip has a fast 128-bit core and 1MB of embedded video RAM to accelerate Win 95 applications. The crisp 11.3-inch active-matrix color screen displays your work at 800 by 600 resolution. While the machine is sturdy, the keyboard is somewhat cramped and the trackball a bit unruly.

Dell Latitude XPi

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
6X	–	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	–	40	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
6X	28.8	144	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	40	0	○	○	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
4X	–	40	0	○	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	14.4	32	0	●	●	●	1/1	13	Sat.	BBS, WWW
–	28.8	80	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	14.4	40	0	○	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	24	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
–	–	40	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
–	14.4	32	0	○	●	○	1/1	13	Sat.	BBS, WWW
–	28.8	40	1	○	○	●	5/5	24	Sat., Sun.	WWW
–	–	40	0	○	○	○	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	1	●	●	○	1/1	14	–	AOL, BBS, CIS, WWW
–	–	40	0	○	○	●	3/3	9	–	–
–	–	24	1	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
4X	–	40	0	○	●	●	1/1	9 [2]	–	BBS

New This Month

The following PCs made our Power Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

NO. 6: GATEWAY 2000 S5-100XL

PROS: Very good performance, good battery life, lightweight and easily portable

CONS: Highest-price P-100 on our chart

The Gateway 2000 S5-100XL is a classy power notebook with a fine keyboard, a good pointing device, and performance to spare. Of course, it can't match the speed of the fastest Pentium-120s and -133s on our notebooks chart, but its PC WorldBench score of 147 is very good for a Pentium-100–based notebook. The S5-100XL isn't cheap, however. At $3349, it's the most expensive Pentium-100 system on our list, but it's well worth the cost.

Gateway 2000

For one thing, the 11.3-inch active-matrix screen is clear and bright, with vivid colors and a handy slider adjustment for fine-tuning the brightness. The integrated stereo speakers are placed in the display panel near the screen hinge, where they can project sound most effectively. Gateway includes a removable 4X CD-ROM drive, allowing you to play popular multimedia titles and install large applications from one disc rather than multiple floppies. The notebook is sturdily constructed, and the ports have a sliding door, which is much less likely to break than a hinged cover. Travelers will appreciate the unit's light 6.8-pound weight as well as its good battery life. The S5-100XL's lithium ion cells held up for 4.8 hours per charge in our battery test.

The keyboard and touchpad pointing device work very well. The former has large, well-placed keys; the latter is particularly smooth and responsive. You can ▶

click with either the touchpad buttons or by tapping on the pad itself. We generally like Gateway's documentation, both for its notebook systems and its desktops. This system's manual is no exception. It's complete, well illustrated, and easy to understand. Toll-free technical support is available 24 hours a day, seven days a week. The other service policies could be better, however. The warranty is none too long at just one year for parts and labor; many notebooks available at this price come with a longer three-year warranty. And the turnaround policy of 14 days on factory repairs seems particularly long on a system where on-site service is not even an option. From the extensive data we've gathered from responses to our fax-back surveys, we rate Gateway notebook reliability and service as fair.

NO. 10: DELL LATITUDE LM P100SD

PROS: Good screen, complete and concise documentation, good battery life

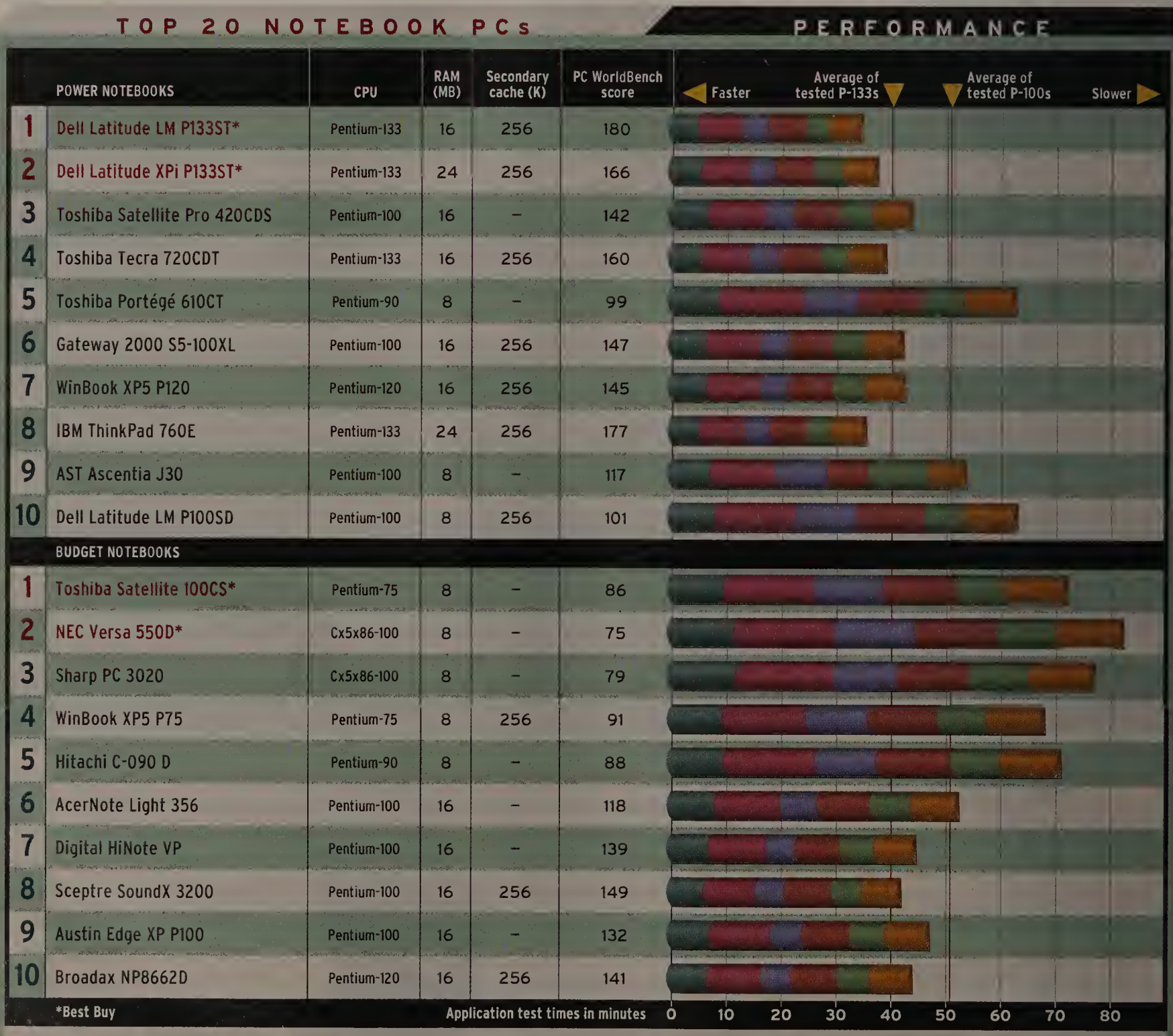
CONS: Slowest Pentium-100 notebook currently on our Power chart

The Dell Latitude LM P100SD's fine overall quality, long battery life, and good reliability and service earn it a spot among our top power notebooks this month. But this $3299 system's performance ▶

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM P133ST*	Pentium-133	16	256	180
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	Toshiba Satellite Pro 420CDS	Pentium-100	16	–	142
4	Toshiba Tecra 720CDT	Pentium-133	16	256	160
5	Toshiba Portégé 610CT	Pentium-90	8	–	99
6	Gateway 2000 S5-100XL	Pentium-100	16	256	147
7	WinBook XP5 P120	Pentium-120	16	256	145
8	IBM ThinkPad 760E	Pentium-133	24	256	177
9	AST Ascentia J30	Pentium-100	8	–	117
10	Dell Latitude LM P100SD	Pentium-100	8	256	101
	BUDGET NOTEBOOKS				
1	Toshiba Satellite 100CS*	Pentium-75	8	–	86
2	NEC Versa 550D*	Cx5x86-100	8	–	75
3	Sharp PC 3020	Cx5x86-100	8	–	79
4	WinBook XP5 P75	Pentium-75	8	256	91
5	Hitachi C-090 D	Pentium-90	8	–	88
6	AcerNote Light 356	Pentium-100	16	–	118
7	Digital HiNote VP	Pentium-100	16	–	139
8	Sceptre SoundX 3200	Pentium-100	16	256	149
9	Austin Edge XP P100	Pentium-100	16	–	132
10	Broadax NP8662D	Pentium-120	16	256	141

*Best Buy



HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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would benefit from a memory upgrade. As with the other 8MB notebooks on our Power chart, the Latitude LM P100SD dips below our expectations of normal performance because of its scanty complement of RAM: It scored just 101 on our PC WorldBench test. This notebook does not match the speedy flash of its more powerful Pentium-133 sibling, the Best Buy Dell Latitude LM P133ST. But it shares a number of the same features: Not only does it also have 256K of secondary cache, even the 810MB hard drive on this unit is the same. The 11.3-inch dual-scan color screen is a bit less spacious, although it almost matches the larger display's quality. And the price is $700 cheaper.

Dell Latitude

The LM P100SD's battery life of 4.8 hours per charge is quite good. We're glad to see Dell and other companies using lithium ion battery packs; they allow many more charging cycles before needing replacement than NiMH batteries do. Although lithium ion cells come at a higher cost initially, they save you money in the long run. And they also hold their charge better when the notebook is not being used. This system has no CD-ROM drive (although a 6X model is optional), so at 8.2 pounds the traveling weight is about a half pound lighter than that of its Best Buy counterpart. Dell includes 16-bit integrated sound and stereo speakers.

As far as we're concerned, the keyboard is one of the best features of this notebook. It's laid out well, and the keys are large, with full travel. The touchpad is very responsive, and you can click with the buttons or the pad.

Dell's service and reliability are both good, according to our reader fax-back surveys. And the warranty covers parts for three years and labor for one. There's a two-day turnaround policy on repairs, and toll-free tech support around the clock. Dell provides fine documentation, both on screen and in the printed manuals.

BUDGET NOTEBOOKS

This Month's Best Buys

NO. 1: TOSHIBA SATELLITE 100CS

PROS: Good value, nice screen and keyboard, vendor is noted for system reliability

CONS: No bundled application software

The Toshiba Satellite 100CS is a perfect first notebook—inexpensive, reliable, and easy to use. Thanks to a $200 price drop since last month, $1799 buys you a well-designed system with the power of a Pentium-75 processor and a good dual-scan color screen. It doesn't have any of the extras you'll find on more expensive notebooks, such as a super-VGA screen, built-in sound, or even an infrared port, but it's well built and comes from one of the most reputable vendors in the business. If you have only basic needs, those attributes should be enough.

The 100CS has a bright 10.4-inch dual-scan display with good controls for adjusting brightness and contrast. The notebook's keyboard is comfortable and responsive, and its eraserhead pointing device is easy to manipulate.

Toshiba Satellite

Because this machine comes with just 8MB of RAM it's not a supreme performer, although it is fast for a notebook in its price range. An 8MB upgrade module costs another $459 and should boost performance by about 15 percent.

Toshiba doesn't bundle any application software with the 100CS, but you'll find several helpful utilities to get you acquainted with your machine. And the printed manuals are well illustrated. Reliability of Toshiba notebooks ranks among the best. An on-screen program monitors battery life, which topped out at around 3.5 hours in our test using typical power management settings.

NO. 2: NEC VERSA 550D

PROS: Very low price, nice design, good display

CONS: No bundled application software

The $1699 NEC Versa 550D is a fair, though not terrific, performer that's inexpensive and well designed. With a Cx5x86-100 CPU and 8MB of RAM, the Versa 550D achieved a PC WorldBench score of 75, which makes it just slightly slower than the average 8MB Pentium-75 notebook. The 550D's battery life, just shy of 3 hours, also is pretty fair. And at 7.4 pounds, including the trim AC adapter, it's pretty easy to carry.

The Versa 550D is sleek and sturdy overall, with gentle curves and protected latches. A small LCD recessed in the notebook's hinge area shows battery-life status and hard drive activity. We especially like the range of brightness and contrast that you can achieve on the 10.4-inch dual-scan display.

NEC Versa

A trackball with large buttons sits in the center of the wrist rest. The buttons work fine, but the trackball's rough texture has its pros and cons: It's easier to control, but it also creates a disconcerting grinding sensation.

NEC doesn't bundle any application software with the Versa 550D, but it does provide good documentation. The system also comes with a one-year warranty. Reliability and service both rate as fair.

New This Month

The following PCs made our Budget Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

NO. 5: HITACHI C-090 D

PROS: Fantastic service policies, comfortable keyboard, good price

CONS: Slow for a Pentium-90 notebook, stiff pointing device, only one PC Card Type II slot

The C-090 D is Hitachi's first notebook, and it gives the company instant credibility: It's an affordable budget entry backed by incredible service policies—though it's short on speed for a P-90. For a $2199 price, Hitachi includes an integrated PCI graphics adapter with 1MB of VRAM. And the large 11.3-inch dual-scan screen is bright and clear. This system is highly portable; at just 6.6 pounds ready to ▶

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travel, it's light on the shoulder. Bundled software includes Delrina WinFax Lite, Lotus Organizer, and TranXit wireless connectivity software.

Hitachi did a wonderful job with its keyboard. The layout on the C-090 D actually reminds us of the IBM ThinkPad's. It's uncrowded, the keys are large, and even the spacebar is bigger than most. The full-travel keys satisfied our toughest reviewers. However, we wish the pointing device were different. The eraserhead track pointer that's inset into the keyboard is quite stiff, making you push harder than usual to move the cursor.

Hitachi C-090 D

Without any secondary cache to help it, this notebook needs an upgrade to 16MB of RAM to pick up its lethargic performance. As is, its PC WorldBench score of 88 is the lowest that we've seen from a Pentium-90 notebook. Much of the system's equipment is standard budget notebook fare: The 720MB hard drive falls right in the middle of the budget pack. Hitachi does include a nice 28.8-kbps internal fax-modem with voice-mail capabilities—which mitigates the lack of a second PC Card Type II slot. But since the usual stack of two PC Card Type II slots is missing, you won't be able to use a PC Card Type III removable hard drive. The system integrates 16-bit sound and stereo speakers. Its battery life, at about 3.8 hours per charge in our battery test, is good, and Hitachi uses lithium ion cells, which should allow more charge cycles than NiMH batteries do before needing replacement.

Hitachi did a fine job on documentation. The manual is easy to understand and well illustrated. And the amazing five-year warranty on parts and labor left us rubbing our eyes—it's the longest we've ever seen on a notebook. In addition, Hitachi throws in a year of free on-site service with a turnaround policy of one business day on repairs. Technical support is toll-free and available 24 hours a day. Because it has just entered the market, Hitachi has no reader ratings on reliability and service.

Sceptre

NO. 8: SCEPTRE SOUNDX 3200

PROS: Fast performance for a P-100 notebook, very good warranty

CONS: Unresponsive touchpad, flimsy port cover, no weekend tech support

With a PC WorldBench score of 149, the Sceptre SoundX 3200 is one of the fastest Pentium-100 notebooks we've ever tested. And it comes with an attractive three-year warranty at a price of $2750. These good points weigh heavily enough to overcome some of the machine's notable deficiencies, such as a poor pointing device and Sceptre's lack of weekend technical support. As a result, the Sceptre SoundX 3200 just makes it onto our Budget Notebooks chart.

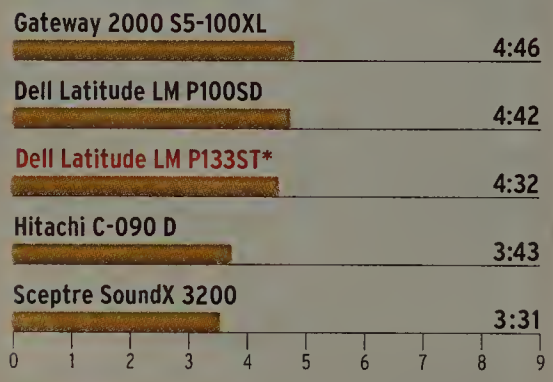
The system has a fairly impressive configuration for a budget notebook: 16MB of RAM, a 256K secondary cache, and an 814MB hard drive. In addition, Sceptre integrates 16-bit sound and good stereo speakers, and provides a healthy 1MB of VRAM on a PCI video controller to complement its 10.4-inch active-matrix color screen. At 7 pounds, this notebook is easy to carry. And the battery life is good at about 3.5 hours per charge.

The SoundX 3200 could be better built. The large port cover that runs across the back of the notebook is unlikely to hold up over the long haul. We have often seen stronger covers snap off in normal use. And the slider latch that opens the notebook is stiff and unwieldy—a real nail-buster. The keyboard is well laid out except for the juxtaposition of the <F1> through <F12> function keys to the hinge. Reach quickly for the <F1> help key, and you can bang your finger against the hinge. Worse, the touchpad remained unresponsive and jerky, despite the fact that we made a number of attempts to adjust its motion. In light of its performance and relatively good price, it's easy to underestimate these seemingly minor drawbacks. While we found we were able to get accustomed to the keyboard without a whole lot of trouble, the touchpad remained an irritant for as long as we used the notebook.

Sceptre's documentation is very generic; nowhere in the manual will you find Sceptre or the model name of the notebook mentioned. The manual does cover the basics, though. Technical support is toll-free but limited to just 9 hours a day on weekdays. Because Sceptre is a relatively small notebook vendor, we get very few fax-back responses from users of the company's systems. As a result, we can't give you a track record on the company's reliability and service. ■

TEST REPORT

Notebook Battery Life



*Best Buy

Time in hours:minutes.

HOW WE TEST We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Beyond the Top 20

We tested these systems along with the others, but they didn't score high enough to reach the Top 20 Notebook PCs chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Altura Bolt2-120**
- **Canon Innova Book 475CDT**
- **Canon NoteJet IIICX**
- **EuroCom 6400T P-150**
- **HP OmniBook 5500CT**
- **Hitachi M-120T**
- **IBM ThinkPad 356XD**
- **Kiwi OpenNote 180C**
- **Magitronic Series 600 P133NB**
- **Maxtech YesBook Model x753**
- **Sharp PC 9030**
- **WinBook XP5-P133**

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RELIABILITY AND SERVICE SURVEY

Win a Gateway 2000 P5-120

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Gateway 2000 P5-120, a Best Buy Pentium-120 PC in this month's Top 20. Send in a separate copy of the survey for each of your PCs.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World,* Box 10-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by October 31.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
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How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer	○ Computrend	○ Hewlett-Packard	○ NEC	○ Tangent
○ Acma	○ Comtrade	○ HiO	○ Netis	○ Texas Instruments
○ ALR	○ CTX	○ Hyundai	○ Packard Bell	○ Toshiba
○ Apple	○ Dell	○ IBM	○ Panasonic	○ Twinhead
○ AST	○ Diamond	○ Insight	○ PerComp	○ USA Flex
○ AT&T (NCR)	○ Digital (DEC)	○ Intelesys	○ Pionex	○ Vektron
○ Austin (IPC)	○ DTK	○ Leading Edge	○ Polywell	○ VTech (Expotech, Laser)
○ Axik	○ EPS	○ Micro Express	○ Quantex	○ WinBook
○ Blackship	○ Epson	○ Micron	○ Robotech	○ Zenith (ZDS)
○ Canon	○ Everex	○ Midwest Micro	○ Samsung	○ Zenon
○ Compaq	○ Future Tech	○ MIS	○ Sharp	○ Zeos
○ Compudyne	○ Gateway 2000	○ Nat'l Micro	○ Swan	○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1-2 weeks
○ 3-4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ Three
○ One ○ Four
○ Two ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Answer for the most recent problem—*other than DOA*—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

How long after you purchased your PC did the problem occur?
○ Less than 1 month ○ 4-6 months ○ More than 12 months
○ 1-3 months ○ 7-12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Wrong configuration ○ Device conflicts ○ Other
○ Incorrectly installed software ○ Faulty peripheral ○ OS problem ○ Don't know

If a component failed, which one was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ System swap
○ On site ○ Component swap
○ In store ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ 1-2 minutes ○ 6-10 minutes ○ More than
○ Less than 1 minute ○ 3-5 minutes ○ 11-20 minutes 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 2-5 hours ○ 11-24 hours ○ 3-5 days
○ 15 minutes-1 hour ○ 6-10 hours ○ 1½-2 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1-2 days ○ More than 1 month
○ 3-7 days ○ Never resolved
○ 8-14 days ○ Awaiting resolution
○ 15-30 days

Was it resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ ○ Satisfied ○ ○ Extremely satisfied

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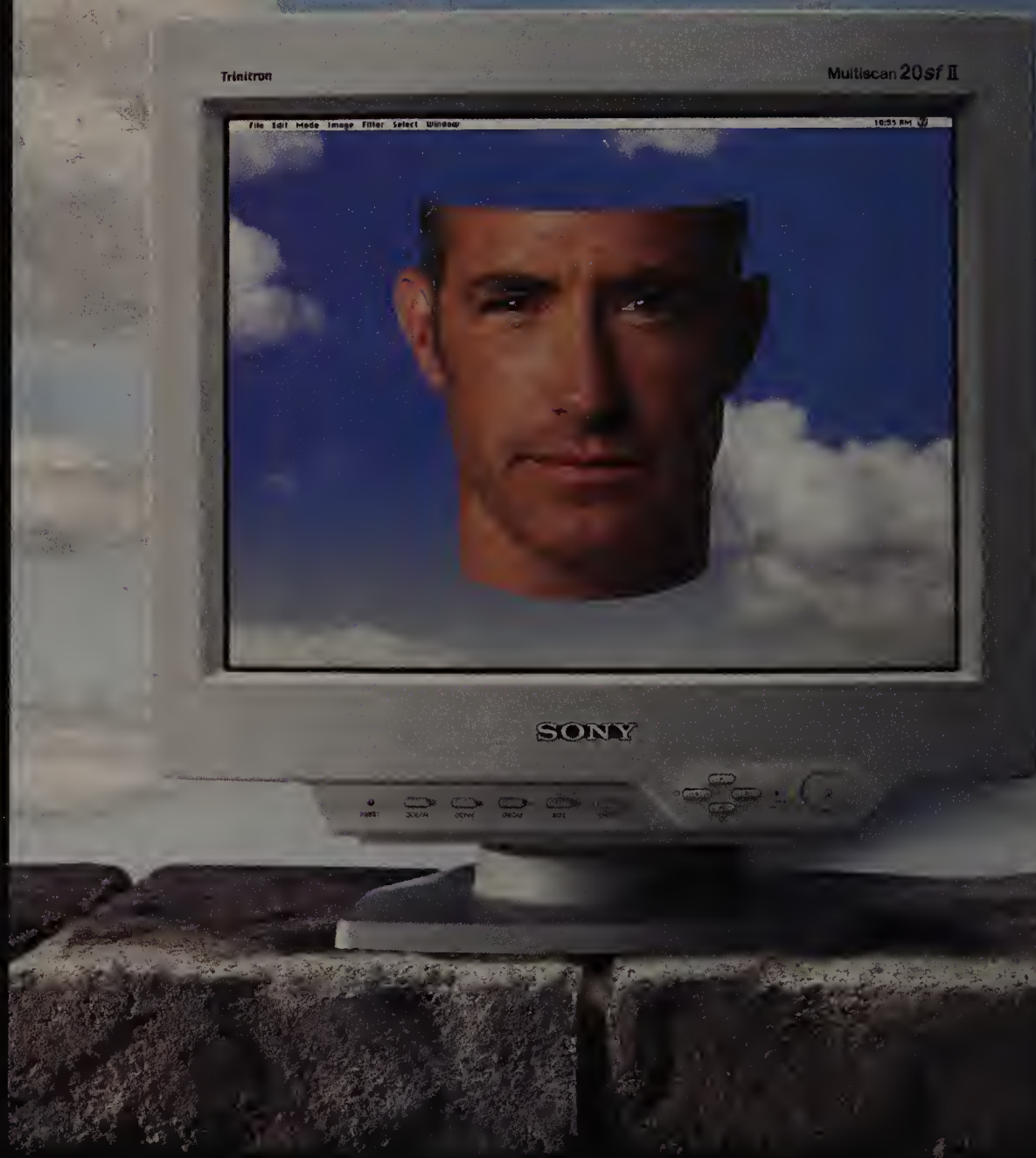

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Circle 32 on reader service card

PC WORLD

TOP 10 PRINTERS

	MONOCHROME PERSONAL PRINTERS	Month tested	Street price (6/26/96)	Overall rating	Speed for plain text	Speed for full-page graphics	Comments	Reader service number
1	Panasonic KX-P6100 800/742-8086 http://www.panasonic.com	Apr 96	$379	84	5.7 ppm	2.3 ppm	**FEATURES:** 6-ppm laser. Standard 256K of RAM, 1200-by-300-dpi maximum resolution, 100 sheets input, 50 output. **PROS/CONS:** Low price, quicker than most competitors, space-saving tower design. Excellent print quality for a 300-dpi model, but no manual-feed slot for envelopes.	757
2	NEC SuperScript 860 800/632-4636 http://www.nec.com	Aug 96	$499	84	6.9 ppm	1.7 ppm	**FEATURES:** 8-ppm laser. Standard 1MB of RAM, 600-by-600-dpi resolution, 200 sheets input, 50 output. **PROS/CONS:** Fastest 600-dpi laser on chart; comes with slick software that makes it easy to print booklets, posters, and more. Most expensive on the chart, however, and gray-scale output is so-so.	758
3	Brother HL-730 800/276-7746 http://www.brother.com	new	$399	83	5.3 ppm	1.1 ppm	**FEATURES:** 6-ppm laser. Standard 512K of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 100 output. **PROS/CONS:** Straighter paper path helps prevent jams; includes Surf 'n Print utility for printing Web pages. Takes up a lot of space when you unfold the output tray; a little slow.	759
4	TI microLaser Win/4 800/848-3927 http://www.ti.com	Apr 96	$329	80	4 ppm	0.6 ppm	**FEATURES:** 4-ppm laser. No standard RAM; 600-by-600-dpi maximum resolution, 100 sheets input, 50 output. **PROS/CONS:** Least expensive laser on the chart; compact footprint lets it fit almost anywhere; easy to set up and use. Text is crisp, but graphics are gritty; full-graphics print times lag.	760
5	NEC SuperScript 660 800/632-4636 http://www.nec.com	Apr 96	$399	80	4 ppm	0.6 ppm	**FEATURES:** 6-ppm laser. Standard 256K of RAM, 600-by-600-dpi maximum resolution, 50 sheets input and output. **PROS/CONS:** Sharp text; installation works over a LAN. Gray-scale printing is just so-so, and this printer has the lowest standard input and output capacities of any laser on the chart.	761
	COLOR PERSONAL PRINTERS							
1	HP DeskJet 820Cse 800/752-0900 http://www.hp.com	June 96	$389	77	3.7 ppm	0.3 ppm	**FEATURES:** 5-ppm monochrome/1.5-ppm color ink jet. 600-by-600-dpi maximum resolution, 150 sheets input, 50 output. Accepts both black and color cartridges. **PROS/CONS:** Very good print quality; excellent paper handling. Color speed is a bit slow; does only a fair job with photographic images.	761
2	HP DeskJet 680C 800/752-0900 http://www.hp.com	June 96	$309	75	1.6 ppm	0.3 ppm	**FEATURES:** 3-ppm monochrome/0.7-ppm color ink jet. 600-by-600-dpi maximum resolution, 100 sheets input, 50 output. Accepts black and color cartridges. **PROS/CONS:** Cheaper than DeskJet 820Cse, but slow, and color print quality not as good. Nearly identical DeskJet 682C bundles Disney printing software.	763
3	Lexmark Color Jetprinter 2050 800/891-0331 http://www.lexmark.com	new	$299	75	0.7 ppm	0.1 ppm	**FEATURES:** 4-ppm monochrome/1-ppm color ink jet. 600-by-600-dpi maximum resolution, 150 sheets input, 50 output. Accepts both black and color cartridges. **PROS/CONS:** Versatile paper handling, excellent black text, and neat printing utilities. But it's slow, and colors look dull on plain paper.	764
4	Okidata Okijet 2010 800/654-3282 http://www.okidata.com	Aug 96	$279	74	1.4 ppm	0.3 ppm	**FEATURES:** 2-ppm monochrome/0.25-ppm color ink jet. 600-by-300-dpi maximum resolution, 150 sheets input and output. Accepts both black and color cartridges. **PROS/CONS:** Large paper tray, handy manual slot for envelopes. Print quality is good overall, but color pages look dull.	765
5	Lexmark Color Jetprinter 1020 800/891-0331 http://www.lexmark.com	Apr 96	$179	74	1.4 ppm	0.3 ppm	**FEATURES:** 4-ppm monochrome/0.5-ppm color ink jet, 600-by-300-dpi maximum resolution, 100 sheets input and output. Swaps black and color cartridges. **PROS/CONS:** Cheapest printer on color chart; comes with CorelDraw 3.0. Print quality is adequate, but cartridge swapping is inconvenient.	766

Best Buy Windows 95-certified Plug and Play For reviews of printers that didn't make this chart, visit http://www.pcworld.com/t10printers.

HOW WE TEST The overall rating for both monochrome and color personal printers is based on print quality (27 percent), price (20 percent); speed (20 percent), features and ease of use (15 percent), service and support (13 percent), and cost of consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.
FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 912.

HOW FAST IS that printer in the window? There's the ideal that you read about in brochures and advertisements—and then there's the reality. The size and complexity of your print job and the resolution at which you print all influence actual speed. Your PC, operating system, and application also affect performance.

Introduced in September, our new chart format shows each printer's performance based on its page-per-minute speeds ▶

for both text and full-page graphics, based on our test suite of Windows 95 business applications: We found that some printers approach the vendors' speed claims when printing plain text, but they all fall short when printing full-page graphics.

In part because of our new emphasis on performance, our Top 10 rankings have shifted. Panasonic's $379 KX-P6100 laser now shares Best Buy status with NEC's SuperScript 860. The 300-dpi Panasonic offers good print quality as well as speed. The SuperScript 860's $499 price is by far the highest on the chart, but NEC is sweetening the deal with a $50 rebate.

FAREWELL TO OLD FAVORITES

THE PANASONIC KX-P6500 fell off the monochrome chart this month, usurped by the TI microLaser Win/4. The TI's $50 price drop to $329 makes it the lowest-priced monochrome printer on the chart. At press time, Genicom had acquired TI's printer business, and Genicom will continue to sell the microLaser Win/4 through the end of the year.

HP's DeskJet 820Cse remains our color Best Buy. It's fast for an ink jet, it produces good-looking results on plain paper, and it's very easy to use.

Several printers that placed on the chart in August—the HP LaserJet 5L monochrome laser and the Epson Stylus Color II, Canon BJC-4100, and Canon BJC-610 color printers—have been discontinued. We'll review the replacements for most of these models in our December issue.

We tested four new printers this month: the Brother HL-730, Okidata OL600e, and Lexmark Optra Ep lasers, and the Lexmark Color Jetprinter 2050 ink jet. The Brother and the Lexmark Color Jetprinter both earned Top 10 spots.

The Brother HL-730, the new number three monochrome printer, is the first we've tested of Brother's new 700 series of lasers, which replaces the 600 series including the HL-630 we tested in April. The HL-730 produces sharp-looking text, but some gray-scale images show banding. Its 5.3-ppm text printing speed is fairly close to its rated engine speed of 6 ppm. The Brother's "straight" paper path—it's actually gently curved—is less likely to jam with thicker paper than the more U-shaped paths of most printers. However, its footprint increases dramatically when you unfold the output tray.

LEXMARK'S NEW, BLACKER INKS

LEXMARK SCORES a color chart position with its $299 Color Jetprinter 2050 ink jet, our new number three color printer. The 2050's new black ink produces some of the the darkest, crispest output we've seen from an ink jet. You also get a fun assortment of utilities, including software for printing stickers, stationery, and even comic books. When we tested the Color Jetprinter 2050 at 600-dpi resolution instead of its default 300 dpi, however, it was very slow; and you'll probably want to print at 600 dpi for the best results.

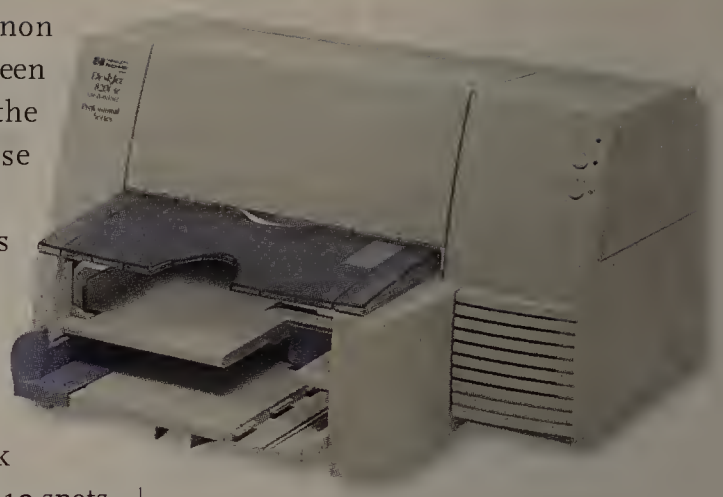
The Lexmark Color Jetprinter 1020, an ink jet we tested in April, appears at number five on our color chart. Its 600-by-300-dpi print quality is average for an ink jet, and you have to exchange cartridges to switch between monochrome and color. But some might tolerate the 1020's limitations considering its rock-bottom $179 street price.

Lexmark's $749 Optra Ep laser, a PostScript version of the Optra E that we tested in August, didn't make the chart. We liked the Optra's print quality and svelte profile, but it's priced high for a personal laser, and its two-piece toner cartridge and imaging drum are a challenge to install.

We tested the Okidata OL600e in April with a Windows 3.1 driver; we've now retested it with its new Windows 95 driver. The OL600e's 300-dpi print quality is adequate, but some pages appear excessively dark, especially gray-scale pictures. Also, if you select Okidata's enhanced "600-dpi quality," it prints very slowly.

—Harry McCracken ■

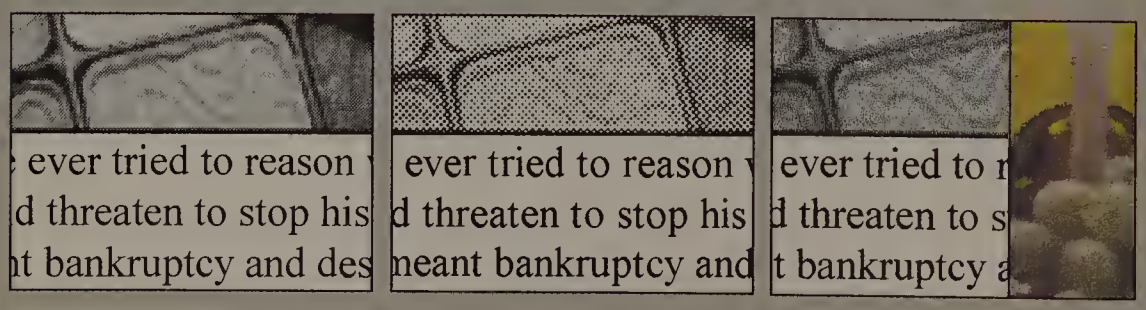
Harry McCracken is a senior associate editor for PC World. *Testing performed by Dave Casini of the PC World Test Center.*



STILL THE BEST COLOR PRINTER, the HP DeskJet 820Cse has outstanding print quality even on plain paper, and its $389 price is competitive.

PRINT QUALITY SAMPLES

Lexmark's New Black Ink Makes Its Mark



BROTHER HL-730
The Brother's finely drawn text equals that from any laser on our chart. Gray-scale images are dark and show some banding, but they still look better than images from the higher-ranked NEC SuperScript 860.

OKIDATA OL600E
With its new Windows 95 driver, the Okidata produces improved text and line art. However, its gray-scale quality is subpar, especially in this photograph, where it resorted to pure black-and-white imaging.

LEXMARK COLOR JETPRINTER 2050
Lexmark's new ink produces noticeably blacker and sharper text. We noticed some banding in gray-scale images. Color images look more realistic, but the palette's a little dull.

TOP RIGHT PHOTOGRAPH: MARC SIMON

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76i/76m†	17" FST (15.7" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56i	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56m†	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI

† Built in stereo amplifier and speakers * Requires DDC compatible video card
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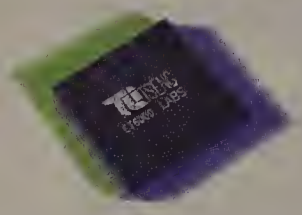

Tseng Labs ET6000, 128-Bit Graphics Accelerator
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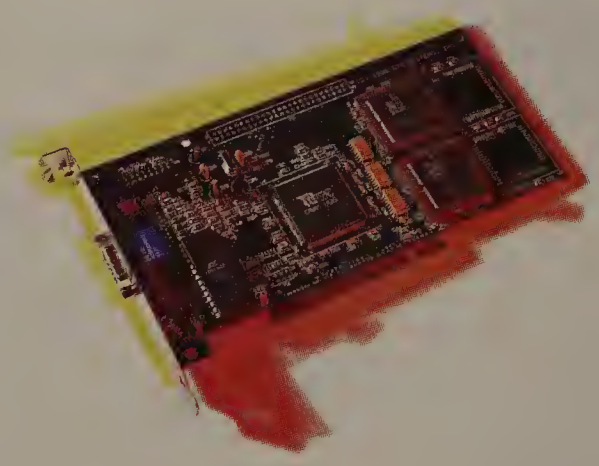
A:



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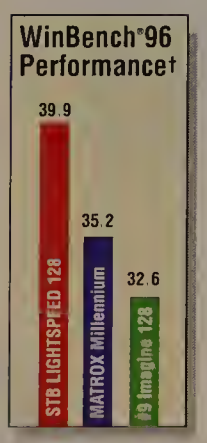

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PC WORLD

TOP 10 MONITORS

	15-INCH MONITORS	Month tested	Street price (7/1/96)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Samsung SyncMaster 15GLi 800/933-4110 http://www.sosimple.com	Oct 95	$408	81	very good/ good	**FEATURES:** 13.6-inch viewable screen, .28mm dot pitch tube, up to 100-Hz refresh rate [1], Level 2b Plug and Play ready [2], color- and image-adjustment software, three-year warranty, 24-hour daily toll-free support. **PROS/CONS:** Low price, very sharp text and graphics, ample on-screen menus, easy to adjust; small viewable screen.	601
2	Mitsubishi Diamond Scan 15HX 800/843-2515 http://www.mela-itg.com	June 96	$450	80	very good/ very good	**FEATURES:** 13.9-inch viewable screen, .28mm dot pitch tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, color- and image-correction software, three-year warranty, 8.5-hour weekday toll-free support. **PROS/CONS:** Very sharp text, detailed graphics, ample on-screen menus; no manual degauss, awkward control buttons.	602
3	Dell UltraScan 15TX 800/289-3355 http://www.dell.com	Feb 96	$424	80	very good/ very good	**FEATURES:** 13.8-inch viewable screen, .26mm Trinitron tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, three-year warranty, 24-hour daily toll-free support. **PROS/CONS:** Very sharp text detail across entire screen, vivid color graphics, uniform screen brightness, easy-to-use menus; very faint line across screen.	603
4	Mitsubishi Diamond Scan 15VX 800/843-2515 http://www.mela-itg.com	new	$410	79	good/ good	**FEATURES:** 13.8-inch viewable screen, .28mm dot pitch tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, color- and image-correction software, three-year warranty, 8.5-hour weekday toll-free support. **PROS/CONS:** Detailed text and graphics, ample on-screen menus; no degauss button to demagnetize tube manually.	604
5	MAG InnoVision DX15T 800/827-3998 http://www.maginnovision.com	Aug 96	$419	78	very good/ very good	**FEATURES:** 13.9-inch viewable screen, .25mm Trinitron tube, up to 85-Hz refresh rate [1], Level 2b PnP ready, three-year warranty. **PROS/CONS:** Low price, text and spreadsheet cells are easy to read, realistic color graphics quality; needs repetitive button pushing to navigate through on-screen menus, faint line across screen.	605
6	NEC MultiSync XV15+ 800/632-4636 http://www.nec.com	June 96	$479	77	good/ very good	**FEATURES:** 13.5-inch viewable screen, .28mm dot pitch tube, up to 103-Hz refresh rate [1], Level 2b PnP ready, color calibration software, three-year warranty. **PROS/CONS:** Contrast and brightness dials are easy to adjust, very detailed graphics; slightly blurred text along left side of screen, no on-screen menus or adjust gauges.	606
7	Panasonic PanaMedia 15 800/742-8086 http://www.panasonic.com	June 96	$499	77	very good/ good	**FEATURES:** 14-inch viewable screen, .27mm dot pitch tube, up to 107-Hz refresh rate [1], speakers and mike, Level 2b PnP ready, three-year warranty, 24-hour daily toll-free support. **PROS/CONS:** Very sharp text, bright graphics, extensive on-screen controls, easy to adjust; screen is a little less bright in the corners, expensive.	607
8	ADI MicroScan 4V 800/228-0530 http://www.adi-online.com	new	$379	77	very good/ very good	**FEATURES:** 13.7-inch viewable screen, .28mm dot pitch tube, up to 100-Hz refresh rate [1], Level 2b PnP ready, two-year warranty. **PROS/CONS:** Terrific price, letters and Web pages are easy to read, simple dials for adjusting contrast and brightness; limited controls beyond making basic adjustments, no on-screen menus.	608
9	Sony Multiscan 15sfII 800/352-7669 http://www.sel.sony.com	Apr 96	$519	76	very good/ very good	**FEATURES:** 13.8-inch viewable screen, .25mm Trinitron tube, up to 95-Hz refresh rate [1], Level 2b PnP ready, three-year warranty, 15 hours of daily toll-free support. **PROS/CONS:** Very crisp text and graphics, vivid colors, on-screen menus are easy to adjust; faint line across screen, no trapezoid adjustment control, expensive.	609
10	Sampo Alphascan 520 770/449-6220	new	$389	76	good/ very good	**FEATURES:** 13.8-inch viewable screen, .28mm dot pitch tube, up to 97-Hz refresh rate [1], Level 2b PnP ready, two-year warranty. **PROS/CONS:** Terrific price, pleasing text and graphics detail, easy to adjust; basic selection of on-screen menu controls, ugly DOS-age menu icons, screen is less bright in the corners.	610

Best Buy

For reviews of monitors that didn't make this chart, visit http://www.pcworld.com/t10monitors

HOW WE TEST We use ten judges to rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 901.**

[1] Highest refresh rate at 800 by 600 resolution. [2] Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

THIS MARKS THE FIRST ANNIVERSARY of *PC World*'s Top 10 Monitors chart. In the last year, monitor quality has gradually increased along with our expectations of what a good picture should look like. For this month's Top 10 list of 15-inch monitors, we used the expanded test suite introduced in September's 17-inch monitor roundup. We retested all the 15-inch monitors from our August list, plus six new models. We used twice as ▶

many typical work documents—from business proposals to Web pages—as in August, and doubled the number of judges, this time including ordinary users from outside our Test Center to ensure that the results reflect typical monitor use.

As a result of additional tests, this month's 15-inch monitor chart looks very different from August's. For instance, Samsung's $408 SyncMaster 15GLi, in ninth place in August, is now our top Best Buy. A full-featured, Plug and Play–ready monitor that's easy to adjust, the SyncMaster 15GLi excelled at displaying our new test images, particularly the Web page. Samsung's recent tube refinements make text and icons look sharper across the entire screen. And you get color- and image-adjustment software.

The next-best value is the Mitsubishi Diamond Scan 15HX, only $42 more at $450. It's as full-featured as the SyncMaster, but the on-screen menus are not as easy to navigate using the four-button control panel. However, the Mitsubishi's viewable screen size is bigger—13.9 inches versus the Samsung's 13.6 inches.

Text and graphics detail on the third-place Dell UltraScan 15TX is impressive. Like the SyncMaster, this $424 Trinitron-based monitor is particularly sharp, even on the left side of the screen, where text and icons are usually concentrated. Debuting in fourth place is Mitsubishi's new $410 Diamond Scan 15VX, a slightly less expensive version of the number two 15HX. Both have the same on-screen controls and bundled software. The only difference is that the 15VX uses a cheaper dot pitch tube, so text and graphics are not as crisp.

The number five MAG InnoVision DX15T ($419) displays better—text is easy to read, and we could spot subtler details in our graphics test screens. For example, we could see the dark knots on a tree trunk in a shadowy grove. However, we didn't like pushing so many buttons to hunt down on-screen menu items.

The former Best Buy NEC MultiSync XV15+ ($479) falls to sixth place because it failed to keep up in one crucial area: text. But graphics still look very good. In the controls department, there are no on-screen menus or gauges that make screen adjustments easier. To compensate for that, NEC bundles color calibration software, which can be used to set the screen to optimal brightness and contrast under a myriad of lighting conditions.

At $499, Panasonic's PanaMedia 15 is one of the most expensive monitors on our chart, but it's the only one with a built-in mike and speakers. Sound quality is okay for Windows events, but not for music. The PanaMedia produces very sharp text, but our judges took off a few points because the corners of the screen weren't as bright as the center.

The last three monitors on the chart—ADI's new $379 MicroScan 4V, the $519 Sony Multiscan 15sfII, and Sampo's new $389 Alphascan 520—offer good all-around picture quality. The ADI and Sampo are bargain priced, but basic controls and shorter warranties put them down the list. The Sony is fine for detailed text and graphics projects, but with its sky-high price, it should include a trapezoid tool.

FULL CONTROL: The Samsung SyncMaster 15GLi's comprehensive on-screen menus, simple drop-down control panel, and handy software bundle give you complete control.

JUST OFF THE LIST

SIX OTHER MONITORS didn't make our chart. The ArtMedia TX1664 (formerly in third) just missed. Graphics look detailed on this .25mm Trinitron monitor, but an unclear URL in our Web-page test image and fuzzy letters along the left side of the screen resulted in low text scores. That, and a high $448 price, nudged the ArtMedia off our chart. The new Pacom Data Display 5Fe15 came close to Top 10 fame thanks to surprisingly crisp graphics at a bargain $299. Its old-fashioned analog dial controls are simple to use, but screen adjustment options are extremely limited.

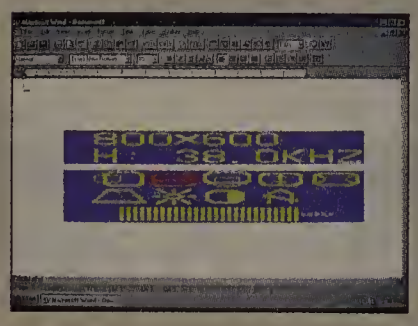
Image quality on the $469 ViewSonic 15GA (formerly in seventh) and the new $350 KDS Visual Sensations VSx-5 was adequate, but we've seen better screens. Both units have a built-in mike and speakers for informal business presentations. The Smile CA1516SL (formerly in fifth) also fell off our list. In June we rated its picture quality as above average, but the unit earned middling scores in our more extensive tests. That, and an awkward control panel, pushed it off the chart. Finally, our judges gave low marks to the new $399 Magnitronic C-SV1500PS due to so-so graphics and a blurry Web-page URL.

—John Goddard ■

John Goddard is a staff editor for PC World. *Testing performed by Jeff Kuta and Susan Silvius of the PC World Test Center.*

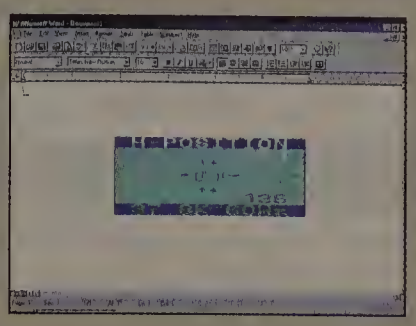
UP CLOSE

Find the Right On-Screen Menu



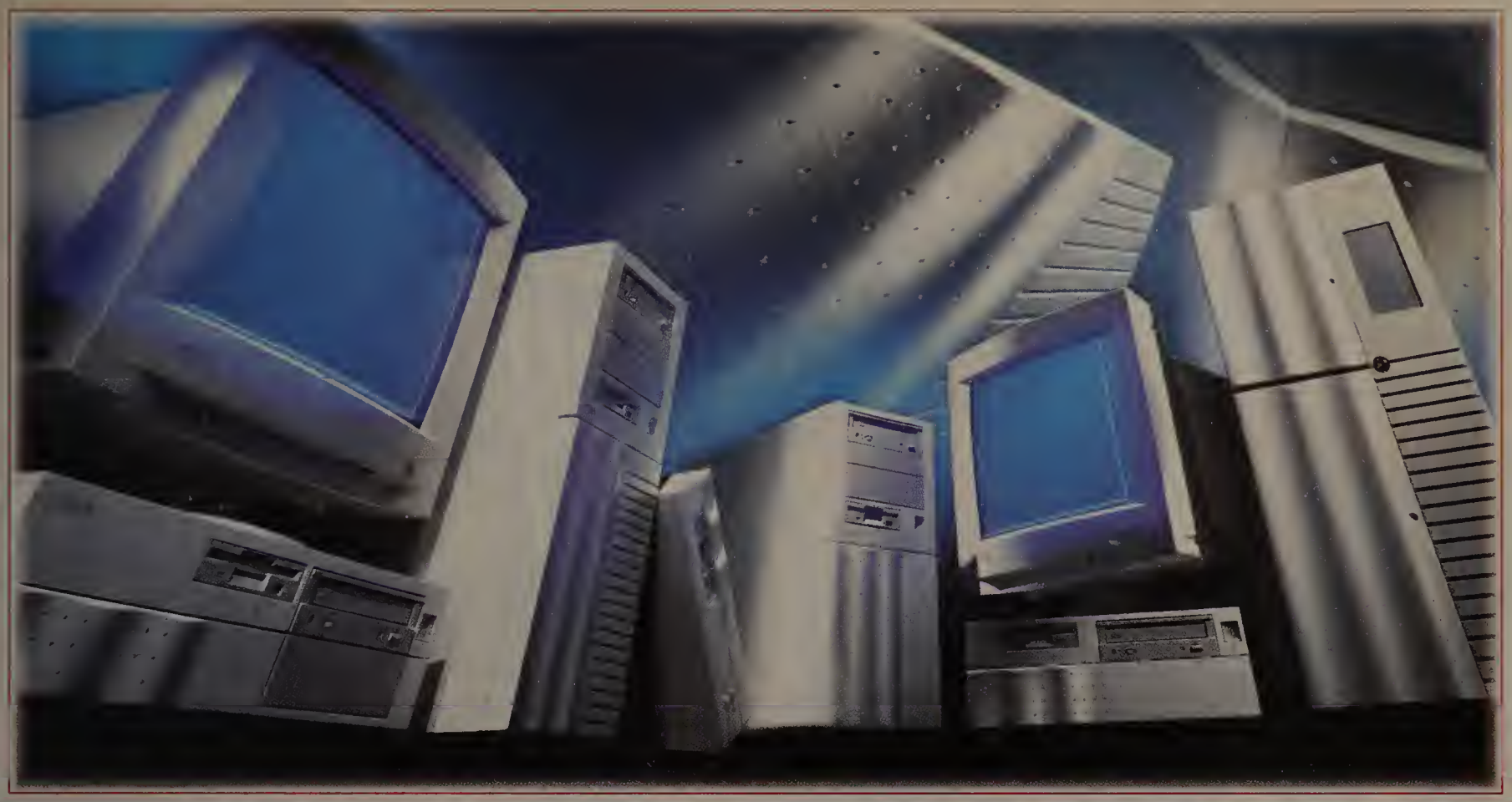
SAMPO

Ugly DOS-age menu icons and a lack of words make it difficult to decipher the Alphascan 520's on-screen menus.



SAMSUNG

Adjust gauges, helpful pointer arrows, and menu descriptions make screen adjustments a snap on the SyncMaster 15GLi.



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Trinitron®*	Trinitron®	Conventional Flat Square Tube	Trinitron®*	Trinitron®	Conventional Flat Square Tube
0.25mm	0.25mm	0.28mm	0.25mm	0.25mm	0.28mm
13.9"**	13.9"**	13.8"**	16"**	16"**	15.6"**
MSRP $399	MSRP $549	ESP $575	MSRP $799	MSRP $879	ESP $849

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Circle 144 on reader service card

PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (7/5/96)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	VideoLogic GrafixStar 600 800/578-5644 http://www.videologic.com	new	$159	96	185 very good	FEATURES: 2M8 of MDRAM, 12D-Hz refresh rate at 1D24 by 768; bundled multimedia apps; Xing MPEG software; DirectVideo; Tseng Labs ET6D0D chip. PROS/CONS: Fast in business and graphics programs, inexpensive, excellent utilities, top-notch AVI and MPEG video; no 3-D acceleration.	701
2	STB Lightspeed 128 888/234-8750 http://www.stb.com	Aug 96	$199	95	186 very good	FEATURES: 2.25MB of MDRAM, 120-Hz refresh rate at 1D24 by 768; bilinear video interpolation; Xing MPEG software; DirectVideo; Tseng Labs ET6DDD chip. PROS/CONS: $3D price drop, great performer with business and graphics, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	702
3	Diamond Stealth 3D 2000XL 800/468-5846 http://www.diamondmm.com	Sept 96	$179	94	183 very good	FEATURES: 2M8 of EDO DRAM, 1DD-Hz refresh rate at 1024 by 768; 3-D acceleration; bundled games; Mediamatics MPEG software; DirectVideo; S3 Virge chip. PROS/CONS: Comes with Diamond's InControl Tools, performs like boards with costlier memory, excellent MPEG playback; tech support can be hard to reach.	703
4	Matrox MGA Millennium 800/361-1408 http://www.matrox.com	June 96	$269	91	184 very good	FEATURES: 2M8 of WRAM, 120-Hz refresh rate at 1D24 by 768; 3-D acceleration; bundled 3-D software; optional MPEG and TV tuner cards; Compcore MPEG software; DirectVideo; MGA-2D64W chip. PROS/CONS: Holds 8M8 of RAM for high-resolution photo editing, superb AVI video; poor MPEG playback, expensive.	704
5	STB Powergraph 64 Video 888/234-8750 http://www.stb.com	June 96	$139	91	175 good	FEATURES: 2M8 of EDO DRAM, 12D-Hz refresh rate at 1D24 by 768; optional MPEG and TV tuner cards; Xing MPEG software; S3 Trio64V+ chip. PROS/CONS: Low price, fast at 1D24 by 768, good MPEG playback, lifetime warranty, toll-free support; not the best choice for image editing because it holds only 2M8 of RAM.	705
6	Cardex Challenger EV 800/539-2273	new	$179	90	187 very good	FEATURES: 2.25M8 of MDRAM, 75-Hz refresh rate at 1D24 by 768; optional TV tuner card; Xing MPEG software; DirectVideo; Tseng Labs ET6DDD chip. PROS/CONS: Top performer by a hair, great all-around board, excellent AVI playback; low refresh rates, old Windows 3.1 utilities, poor MPEG playback.	706
7	ATI 3D Xpression 905/882-2600 http://www.atitech.ca	Sept 96	$199	89	174 good	FEATURES: 2M8 of EDD DRAM, 1DO-Hz refresh rate at 1D24 by 768; 3-D acceleration; optional MPEG and TV tuner cards; ATI MPEG software; ATI 3D Rage chip. PROS/CONS: Affordable all-in-one graphics board with 3-D functions, faster in Windows than ATI Video Xpression, good MPEG playback; not ideal for high resolutions.	707
8	Diamond Stealth64 Video 2201 800/468-5846 http://www.diamondmm.com	new	$143	88	172 good	FEATURES: 2M8 of EDD DRAM, 1DD-Hz refresh rate at 1D24 by 768; optional MPEG and TV tuner cards; Mediamatics MPEG software; S3 Trio64V+ chip. PROS/CONS: Inexpensive board suited for basic Windows programs, good utilities; choppy AVI, poor MPEG playback.	708
9	Hercules Terminator 64/Video 800/532-0600 http://www.hercules.com	June 96	$169	87	172 good	FEATURES: 2M8 of EDD DRAM, 9D-Hz refresh rate at 1024 by 768; optional MPEG and TV tuner cards; Xing MPEG software; S3 Trio64V+ chip. PROS/CONS: Low-cost board with extensive software utilities, good MPEG playback; performance good for business programs but not for complex, high-resolution graphics.	709
10	Diamond Stealth64 Video 2201TV 800/468-5846 http://www.diamondmm.com	July 96	$224	86	175 good	FEATURES: 2M8 of EDO DRAM, 1DD-Hz refresh rate at 1D24 by 768; built-in TV tuner; optional MPEG card; Mediamatics MPEG software; S3 Trio64V+ chip. PROS/CONS: TV on your PC without compromising Windows performance, excellent MPEG playback; not suited for complex graphics, readers tell us tech support is hard to reach.	710

Best Buy Windows 95-certified Plug and Play For reviews of graphics boards that didn't make this chart, visit http://www.pcworld.com/t10graphics.

HOW WE TEST We tested boards under Windows 95 with PC World8ench 1.D at 8DD by 6DD resolution at 16.8 million colors (reported here) and at 1D24 by 768 at 65,536 colors. 8oards were tested in a Dell Dimension XPS P133c with 16M8 of EDD DRAM and 256K of pipeline-burst secondary cache. The overall rating is based on performance (4D percent), features (3D percent), price (2D percent), and support policies (1D percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 907.**

TODAY'S FASTEST BOARDS are also inexpensive: VideoLogic's new $159 GrafixStar 600 tops this month's chart, while the $179 Cardex Challenger EV comes in at number six. They're two of the fastest Win 95 accelerators we've tested, but you can't tell from their prices. The GrafixStar has some of the best utilities we've seen and several multimedia programs. Also new to the Top 10 is the bargain-priced $143 Diamond Stealth64 Video 2201. It replaces the 2201XL, which was on the chart from November 1995 to July 1996 but came with outdated graphics software. ■

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PC WORLD

TOP 10 MODEMS

	EXTERNAL MODEMS	Month tested	Street price (7/21/96)	Overall rating	Average time to send five file types (min:sec)	Comments	Reader service number
1	U.S. Robotics Courier V.Everything V.34 800/877-2677 http://www.usr.com	Jan 96	$275	91	4:08	**FEATURES:** Fax Class 1 and 2.0 (standard), FlashROM, manual volume control, password protection, QuickLink II fax/data software. **PROS/CONS:** Best performer on chart, alternating voice/data, full feature set, five-year warranty; still expensive despite price drop.	711
2	Motorola Lifestyle 28.8 800/566-3266 http://www.mot.com/modems	Mar 96	$200	89	4:12	**FEATURES:** Fax Class 1 only, stores two phone numbers for callback, password protection, Caller ID, QuickLink II fax/data software, five-year warranty, toll-free support. **PROS/CONS:** Top-notch performer, attractive price, good support; apart from security enhancements, feature set is basic.	712
3	Practical Peripherals ProClass 288 V.34 With LCD 770/840-9966 http://www.practinet.com	Nov 95	$309	87	4:24	**FEATURES:** Fax Class 1 and 2 (protocol), 230.4-kbps modem-to-PC speed, manual volume control, distinctive ring, five-year warranty. **PROS/CONS:** English-language status display, nice documentation and feature set; despite $50 price drop from last month, most expensive modem on chart.	713
4	Zoom v.34X Fax Modem 800/631-3116 http://www.zoomtel.com	July 96	$149	87	4:43	**FEATURES:** MNP-10EC error control, Fax Class 1 and 2 (protocol), Winfax Lite and Comit for Windows Lite, seven-year warranty, 14.5 hours of support per weekday. **PROS/CONS:** One of the lowest-price V.34 external modems you can buy, very good support policies, good manuals; a little sparse on features.	714
5	Microcom DeskPorte 28.8P 800/822-8224 http://www.microcom.com	Apr 96	$190	87	4:36	**FEATURES:** MNP-10 error control, Fax Class 1 and 2.0 (standard), serial cable, FlashROM, parallel port connection, callback, password protection, Faxworks 3.0, five-year warranty. **PROS/CONS:** Very good performer, low price, great feature set, friendly documentation; support policies are so-so.	715
	PC CARD MODEMS						
1	Zoom V.34C 800/631-3116 http://www.zoomtel.com	Mar 96	$199	88	4:55	**FEATURES:** MNP-10EC error control, FlashROM, direct connection to cellular phones, two-year warranty, 14.5 hours of support per weekday, overnight replacement. **PROS/CONS:** One of the cheapest PC Card modems on chart, solid performer; installation required a call to tech support.	716
2	Megahertz XJ4288 800/527-8677 http://www.megahertz.com	July 96	$280	88	4:50	**FEATURES:** Built-in phone jack, Fax Class 1 and 2 (protocol), FlashROM, 230-kbps modem-to-PC speed, direct connection to cellular phones, digital line alert, five-year warranty. **PROS/CONS:** Feature-rich, excellent manuals, even technophobes can install it; priciest PC Card unit on chart.	717
3	Hayes Optima 288 V.34+Fax for PCMCIA With EZjack 770/840-9200 http://www.hayes.com	Feb 96	$269	87	4:32	**FEATURES:** Fax Class 1 and 2 (protocol), FlashROM, built-in phone jack, 230-kbps modem-to-PC speed, distinctive ring, callback, Caller ID, SmartCom, five-year warranty, toll-free support. **PROS/CONS:** Excellent performer, feature-packed, great support policies, installs easily; price is a little high.	718
4	TDK Systems DF2814 800/999-4835 http://www.tdksystems.com	May 96	$199	86	4:37	**FEATURES:** MNP-10EC error control, Fax Class 1, FlashROM, 300-kbps modem-to-PC speed, direct connect to cell phones, callback, QuickLink II fax/data package, five-year warranty, toll-free support. **PROS/CONS:** Great performer, aggressively priced, good support policies; installation required a support call.	719
5	Multi-Tech Systems MultiModem LT 800/328-9717 http://www.multitech.com	Apr 96	$249	86	5:20	**FEATURES:** Fax Class 2 (protocol), FlashROM, phone cable has two jacks, MultiExpress/MultiExpressFax, five-year warranty, toll-free support, overnight replacement. **PROS/CONS:** Competitive support policies, easy installation; comes with few extras, slowest modem on chart.	720

Best Buy Windows 95-certified Plug and Play For reviews of modems that didn't make this chart, visit http://www.pcworld.com/t10modems.

HOW WE TEST We tested throughputs for a pair of identical modems on a simulated public-service telephone network using five file types and 55 line conditions. The overall rating is based on price (3 to 20 percent), features and ease of use (32 to 38 percent), performance (40 to 46 percent), and support (8 to 13 percent). Data based on tests designed and conducted by the PC World Test Center.
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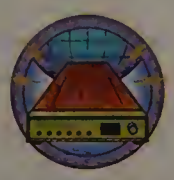

A $133 PRICE DROP shoots the U.S. Robotics Courier V.Everything V.34 to the top of our external chart, and on the PC Card chart a $20 drop is just enough to make the Megahertz XJ4288 a Best Buy along with Zoom's V.34C. Prices continue to drop on both charts, with four of the modems featured dropping $20 or more from last month. For the first time since we started reviewing modems, every PC Card on our chart costs less than $300. ■

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Number Nine,® and STB.® Demand S3d on games from

Interplay,® Activision,® Eidos,® Mindscape® and on titles like

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The Why: Because you want 3D so real it screams.

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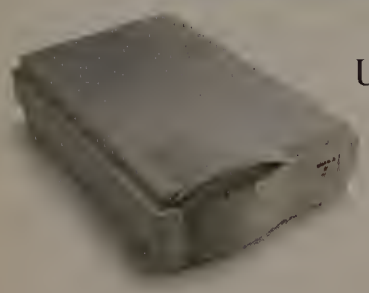
Lamp	✔ Cold cathode - lasts longer	Fluorescent
Tech support	✔ Toll free	No 800 number
Price[2]	✔ $821	$ 912



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[1] 33-bit equivalent with the analog gamma correction. [2] Average street price from sampled advertisements in Computer Shopper May, 1996.

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EDITED BY

Christina Wood

ILLUSTRATION BY JAMES STEINBERG

THE INTERNET MEETS the Couch POTATO

With set-top boxes, smart phones, and even modem-equipped TVs, you'll soon be able to surf the Net without leaving your couch. So much for the hype. Here's the real story.

BY ROBERTA FURGER

YOU'VE READ ABOUT THEM in newspapers and magazines, you've seen prototypes on TV—now get ready for *Invasion of the Internet Appliances.* If even one-quarter of the hype pans out, you should be seeing modem-equipped TVs and set-top boxes, so-called smart phones, and a motley assortment of PC hybrids by the end of the year.

Though their price tags and capabilities will vary considerably, these new gadgets are all designed around the same basic premise: to bring Web-surfing pleasure to the computerless masses and get computing out of the office and into the family room.

The concept sounds intriguing. These low-cost, easy-to-use appliances will connect you to the Internet, as well as to private commercial services for banking, shopping, and even reading a customized version of your local newspaper. No more waiting in line at the family PC just to check your e-mail. Even your computerphobic in-laws will be sending e-mail to Aunt Jo and surfing the World Wide Web from their easy chairs, the kitchen counter, or the bedroom.

ILLUSTRATIONS BY JAMES STEINBERG

The Bandai: Half game system...
....half Net-surfing machine.

The Diba browser meets Zenith TV.

The Transphone dials up the Net.

Looking to Hook Up to the Net?

You may be able to do it via phone, a box that sits on your TV, or the boob tube itself. From the Akai set-top box to Zenith televisions, so-called Internet appliances are popping up everywhere.

Acorn's Oracle-based set-top box.

Akai's prototype Net box.

But while dozens of companies are talking about innovative new products, so far there's very little hardware you can actually get your hands on. At press time many of these devices weren't even available as prototypes, let alone production models.

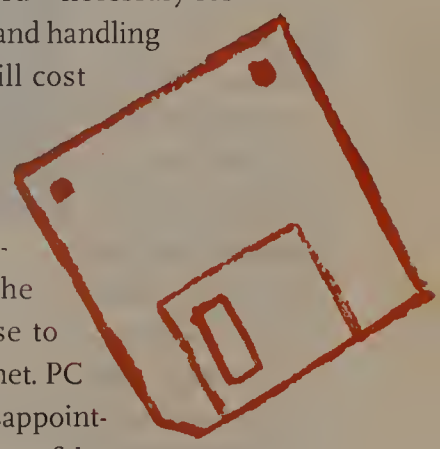
And although many companies say they'll be selling products by this fall, critical questions remain unanswered: How will we be able to get ahold of these gizmos? Are TV sets and screen phones really the best ways to cruise the Web? And most important, with multimedia Pentiums available for as little as $1500, why would anyone spend between $300 and $1000 for a product that does nothing but connect them to the Internet?

We looked at what early prototypes were available, and talked to the players furthest along in developing these new machines. Our first impression? Many of these devices won't be as cheap or as easy to use as advertised. Here's a sneak peek at some of the information appliances and other digital gadgets you may be seeing before the end of the year.

TUBE TOPPERS

BY ALL ACCOUNTS the cheapest, easiest way to connect to the Internet without a PC will be by using a set-top box that hooks to your TV. A handful of these boxes have been announced from Akai, Acorn Computer (built around the technology developed by Oracle spin-off Network Computer), and Bandai (using Apple's Pippin technology). At press time, Philips and Sony had each announced set-tops of their own, both of which will use technology provided by WebTV Networks. Meanwhile, start-ups Diba and ViewCall America are licensing their own Net technologies to a range of set-top vendors.

Prototypes of these set-tops were not available, but when we talked to the companies we found that the boxes will have much in common. They'll be inexpensive (around $300) and should be as easy to install as a TV cable box. Once hooked up and turned on, they'll automatically connect to a local Internet service provider. All will initially come with a 28.8-kilobits-per-second modem (boxes featuring high-speed ISDN or cable modems may be available later) and a remote control with a built-in trackball. However, a remote keyboard—necessary for surfing the Web and handling your e-mail—will cost you extra.



The biggest difference among these products will be the software you use to browse the Internet. PC users may be disappointed to find that none of these devices support Netscape Navigator or Microsoft's Internet Explorer. Though the set-tops' built-in browsers will offer popular features like bookmarks and access to e-mail and newsgroups, your favorite pages won't look quite the same on your TV screen as they do on your PC monitor.

On the positive side, these units should be very portable so you can move them from one TV to another—provided, of course, that a phone jack is nearby. ▶

BIG SCREENS WITH A LITTLE EXTRA

IF U.S. COUCH POTATOES like their big-screen TVs for sports and sitcoms, they'll love them for surfing the Internet. At least that's the philosophy behind one of the first Internet TVs, due out from Zenith just in time for the holidays.

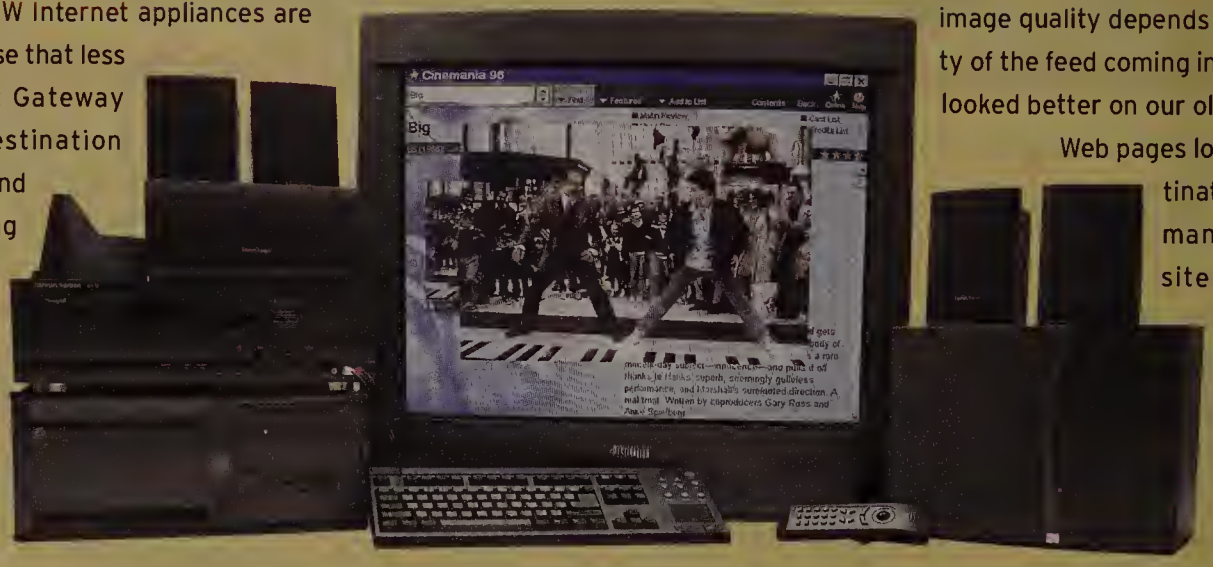
Zenith's new NetVision line of big-screen TVs will come equipped with browser and e-mail software, an infrared remote control with a built-in trackball, and a 28.8-kbps modem. An Ethernet port will let you upgrade to a cable modem down the road. A 27-inch model will sell for $999—roughly $400 more than a standard Zenith TV of the same size. It will be available at many home electronics stores currently selling Zenith TVs. A considerably more expensive ($3500) 35-inch model will be available only from select dealers. Like set-top box manufacturers, Zenith plans to offer wireless keyboards as an extra-cost option.

Zenith will be one of the first companies to ship a product that uses technology developed by Diba, a Menlo Park, California, start-up. Like Network Computer, Diba has developed its own software for Internet appliances, complete with a network browser and e-mail software. The idea, says Stuart Read, Diba's vice president of market development, is to create self-contained devices that require little or no configuration or maintenance.

But the NetVision TVs aren't PC wannabes. There's no local storage, and printer support won't be available in the first releases. Experienced Net cruisers may be disappointed to find that they're limited to the Diba Web TV browser and will not be able to use Navigator or Internet Explorer. The units' standard TV remote control will double ▶

The Gateway 2000 Destination: Is Bigger Really Better?

MOST OF THE NEW Internet appliances are built on the premise that less is more. But not Gateway 2000's new Destination PC. This 200-pound monolith—including a 31-inch monitor that doubles as a television set—is designed around the concept that bigger is definitely better. We had the Destination as a house guest this summer and, frankly, I'm not so sure about it.



IT'S REALLY BIG! Part PC, part home entertainment system, Gateway's $3500 Destination could have a huge impact on your family room furniture arrangement—and your budget.

The Destination is no simple appliance. First, there's the price tag: a staggering $3500 to $4400 depending on the configuration. The Destination is really just an overgrown Windows PC, with plenty of cables to hook up and the inevitable hardware and software conflicts.

Our first problem? Where to put it. Once we'd rearranged all the furniture in the family room, we were excited about playing Monopoly, watching the tube, and yes, cruising the Web from the comfort of our couch.

Alas, this was not to be. Neither the remote control nor the keyboard worked more than four feet from the monitor. And we weren't the only ones with this headache. Six weeks after the first Destinations left the shipping dock, Gateway halted production due to the erratic performance of the remote control and keyboard. However, by mid-July Gateway was shipping new receivers, keyboards, and mice that all worked like a charm.

But the unreliable remote devices weren't the only problem. The TV image was also less than ideal. Gateway says the Destination's image quality depends entirely on the quality of the feed coming in, but the same shows looked better on our old 19-inch TV set.

Web pages looked fine on the Destination's big screen, but maneuvering from one site to the next was a pain. Even after I got the new receiver and remote control, I found it annoying to have to switch between trackball and keyboard every time I wanted to enter a new Web address.

The latest Destinations (which should be shipping by the time you read this) include a new video board and drivers that should improve the TV image. But some design problems—such as an annoying hum emanating from the CPU—are probably there to stay.

After a month with the Destination, I was ready to put my family room back together. Sure, everyone loved the big-screen TV, but when we wanted to play a computer game or access the Net, we fired up our desktop PC—not the Destination. The new models work a lot better, but I don't think I'd pay $4000 just to cruise the Net from my couch. *Gateway 2000, 800/846-2000.*

ILLUSTRATIONS BY JAMES STEINBERG

Outrageously fast 2D graphics—plus 3D.

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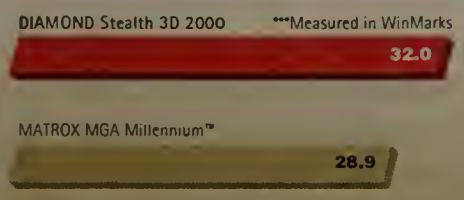
WinBench® 96 Comparison in 24-bit Color Mode



3D Hardware Features Comparison

	Stealth 3D Family	MATROX MGA Millennium
Gouraud Shading	◆	◆
Perspective Correction	◆	
Alpha Blending	◆	
Mip Mapping	◆	
Bilinear Filtering	◆	
Z-Buffering	◆	◆

Stealth 3D 2000/3000 Comparison

	Stealth 3D 2000XL	Stealth 3D 3000XL
Memory	Silicon Magic DRAM	VRAM
RAMDAC	135 MHz	220 MHz
Max Memory	4MB	8MB
Max Resolution	1280 x 1024	1600 x 1200
Bundled Software*	• Descent II • Compton's Interactive Encyclopedia 1996 • Destruction Derby	• Descent II • Compton's Interactive Encyclopedia 1996 • 3D F/X • Digital Video Producer • MS Internet Explorer

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S3 Inside

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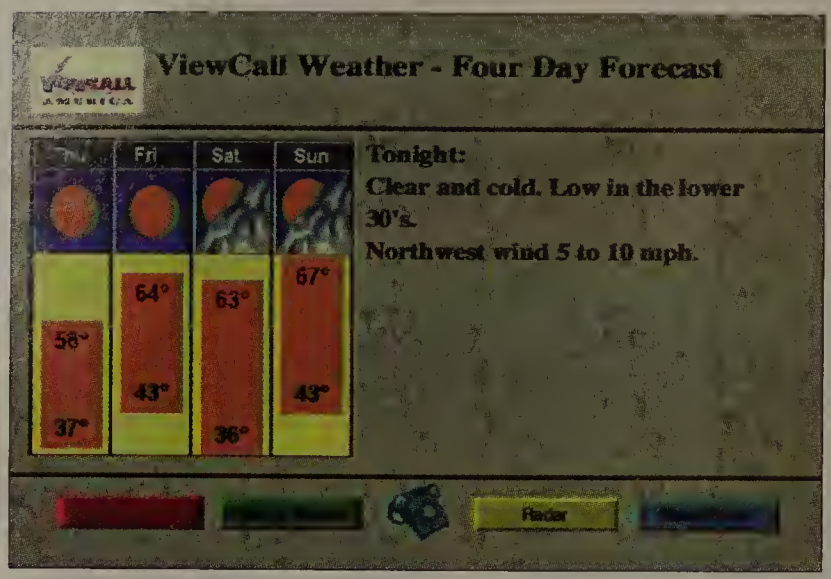
Circle 60 on reader service card



WEB BROWSERS, like this one from ViewCall America, will be standard on every Internet appliance. But most won't be as capable as Microsoft's Internet Explorer or Netscape Navigator.

as a mouse for navigating in the Diba browser, but that's a long way from the one-button Web access that Internet newcomers need.

Your favorite home pages won't look the same on a NetVision TV as they do on your PC, either. Like set-top box makers, Diba has developed software that adjusts the computer images so they fit—and look reasonable—on a television screen.

Using picture-in-picture technology, you'll be able to enjoy simultaneous Web access and TV viewing—for example, watching the World Series while checking out player stats on your team's home page, or joining an online chat while catching the season premiere of *ER*. But there are a few problems. Even at 28.8 kbps, Web access can be painfully slow: By the time *ER* aficionados have logged on, located the Web page, and started chatting, they'll likely have missed a good portion of the drama unfolding on screen.

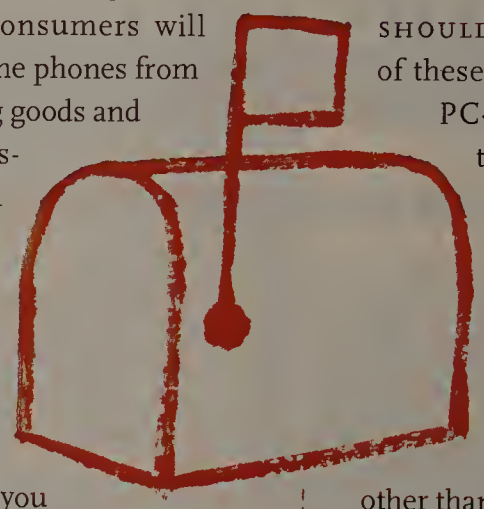
In addition, all-in-one devices are typically more expensive to repair than modular units. And with prices starting at $1000, these Net-savvy TVs are a riskier investment than set-tops and other forthcoming Web appliances.

REACH OUT AND SURF?

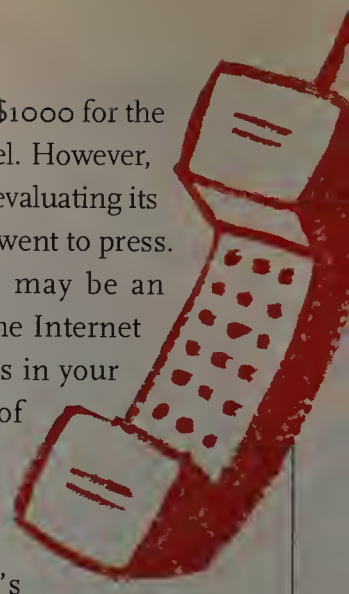
FROM SLIM-LINE Princess models to multichannel cordless units, consumers love their phones almost as much as their television sets. Hence the introduction of so-called smart phones that will let you access the Internet and other private services for banking, shopping, and more.

One of the first such products is the Transphone, from the company of the same name. The device is about the size of a small notebook computer and combines a full-featured telephone (speakerphone, answering machine, hold button, and so on) with browser software, a modem, a keyboard, and a notebook-style flip screen.

The Transphone will be available in several major metropolitan markets by the end of the year, according to the company. Most consumers will either buy or rent the phones from companies offering goods and services on Transphone's dedicated network, such as banks and telephone and cable services. Buttons across the top of the device's keyboard will connect you to these merchants, while Netscape Navigator helps you move around the Web. Navigator will actually run remotely on the company's server, but the image appears on the Transphone screen. A neat idea, but the browser's actual performance was rather slow in the demo model we saw.



The company had not yet finalized its distribution plans at press time, but it expects to release two versions of the Transphone: a low-end unit with a monochrome display and a 14.4-kbps modem, and a high-end model with a color display, extra memory, and a faster modem. Customers should be able to either rent the phones, paying a monthly fee that varies depending on which services they subscribe to, or buy the units outright. Early estimates on pricing ranged from $380 for the basic unit to $1000 for the top-of-the-line model. However, the company was reevaluating its pricing plans as we went to press.



The Transphone may be an easy way to bring the Internet into different rooms in your home, but it's full of compromises that PC users will find hard to live with. The low-end unit's 14.4-kbps modem will seem terribly slow, and the monochrome display means that users will miss out on many cool Web graphics. The high-end model will remedy those deficiencies, but its price could end up approaching that of a desktop PC. Newcomers to the Net may like the one-button access, but potentially high cost may deter many buyers.

ELECTRONIC WHITE ELEPHANTS?

SHOULD YOU RUSH OUT to buy one of these new Internet appliances or PC-TV combos? The analysts think you will. International Data Corporation, a market research firm in Framingham, Massachusetts, estimates that by the year 2000 roughly 22 million consumers will be accessing the Internet using something other than a computer.

But given some of the hurdles—the slowness of accessing the Net at 28.8 kbps (forget 14.4) and the compromises associated with viewing Web pages on a TV or monochrome screen, as well as the high price of some units—it seems doubtful that PC users will embrace this new technology in huge numbers.

For now at least, the trade-offs are high and the value is low, particularly if you'll have to pay monthly fees to access services. The promise of connecting easily to the Web, sending e-mail, and even shopping and banking without plunking down $2000 for a new PC is attractive. But we're a long way from making that promise a reality for everyone. ■

Roberta Furger is a PC World *contributing editor.*

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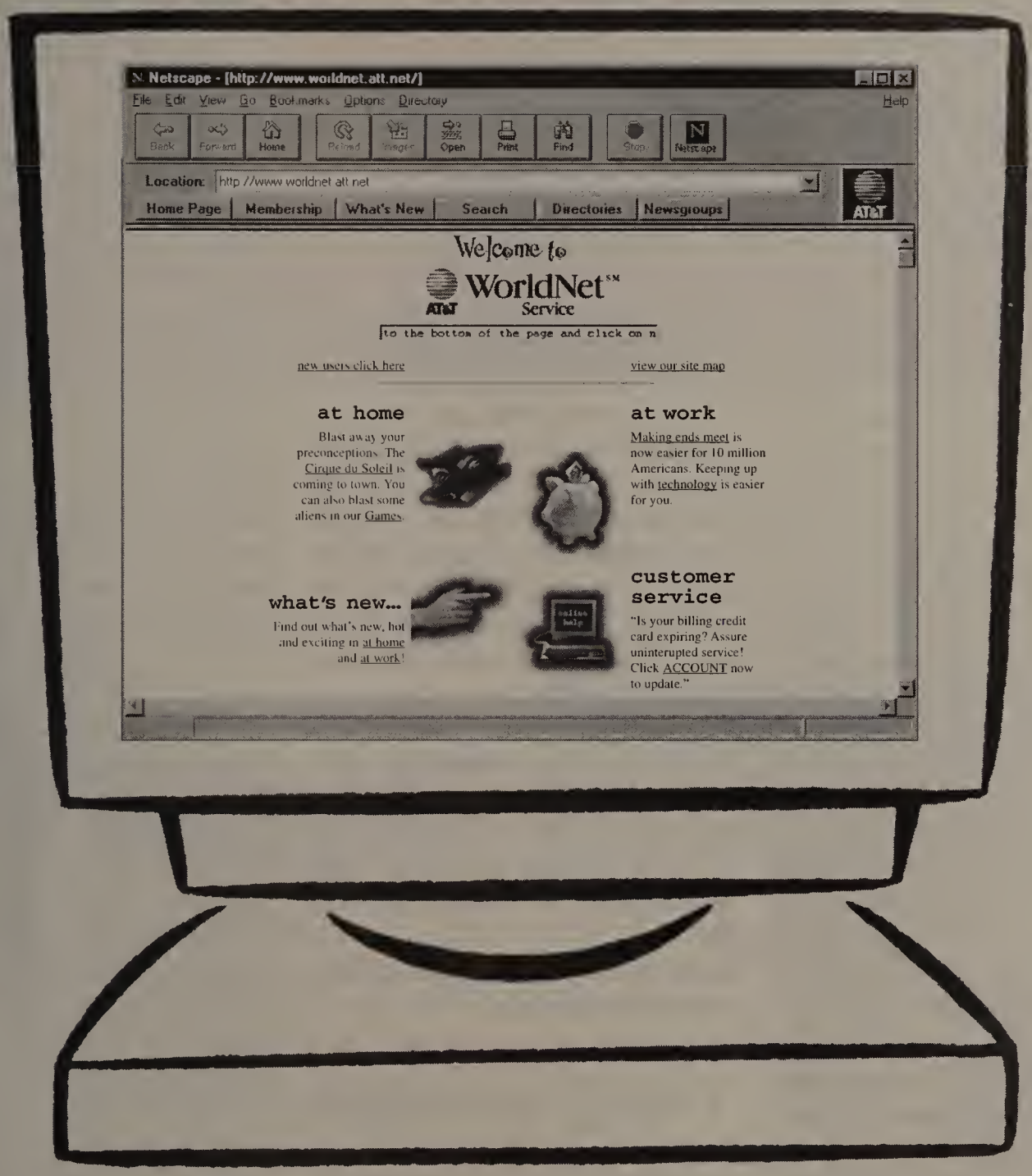

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Browsers Meet Bowsers; Python and Paradise

PLAYING FETCH ON THE NET

A NEW SUITE OF INTERNET UTILITIES, **Web.Max** is hosted by Max, a hipped-out beagle who appears at the prompt of "here boy!" Tell Max to "fetch," and you get the Net Retriever, which harnesses ten online search engines. Tell Max to "guard," and you can lock any file or folder. Then there's the Web.Max Phone, the Web.Max TV, and the Web.Max Downloader.

Don't believe the hype. The retriever is efficient, and the TV is a good place to collect online news, but Max is one lazy dog. Retrieval functions with names like Top Sites and Kid's Pages lead you to believe Max is making a careful search, when he's really just shuttling you to a Web page that's already done the work. Web.Max is fine if you're brand spanking new to the Net, but experienced users will balk at its parabolic site-jumping and 1970s sci-fi-movie interface. Damn dog's ornery, too—he kept getting in fights with my browser, forcing me to reboot every half hour. Bad dog! Bad! —*Glenn McDonald*

Web.Max

GRADE: **C–**; PRICE: $40 street; Berkeley Systems; 510/540-5535; Windows 95.

READER SERVICE NO.739

A TOURIST'S VIEW OF PARADISE

AS WINTER APPROACHES, do you find yourself dreaming of sunny beaches and mai tais? If you're planning your first Hawaiian vacation, Graphix Zone's **Experience Hawaii** is a good place to start your research. Focusing on the islands of Oahu, Maui, Kauai, and Hawaii, the disc includes tips on travel, accommodations, dining, recreation, entertainment, sightseeing, kids' activities, and transportation. There's also a complete index, a phone directory, and a travel notebook. Numerous video clips featuring locals and tourists provide advice on a wide range of topics.

The disc isn't perfect: Experience Hawaii's listings aren't as extensive as those in traditional guidebooks, and many of the video clips aren't worth the QuickTime they're created in. (For example, one tourist advises you to "talk to your hotel's concierge for suggestions on what to do in Oahu." Brilliant.) Also, the focus is firmly on mainstream tourist activities, so if you prefer a more unique vacation, you'd be better off getting a more comprehensive guidebook.

—*Anne Kandra*

Experience Hawaii

GRADE: **B**; PRICE: $39.95 list; Graphix Zone; 800/828-3838; Windows 3.*x*, Windows 95.

READER SERVICE NO. 740

A Keyboard With Eyes

NOW YOU CAN COMPUTE without being tied to the computer, with the **Lifetime Wireless Keyboard** with Integrated Touchpad Mouse. Key Tronic claims you can work on its wireless keyboard with the built-in touchpad mouse anywhere within 50 feet of your computer. But if the infrared beam between the receiver box and the keyboard isn't lined up just right, you'll lose your connection—and your work. I liked the feel of this keyboard and found the touchpad responsive, but the signal loss was annoying. If you don't want to hassle with infrared alignment, you can get an identical wired version and save yourself some $50. Key Tronic guarantees its Lifetime line of keyboards for life. Too bad the company can't promise the infrared eyes will have 20/20 vision. –**Michael S. Lasky**

Lifetime Wireless Keyboard (infrared)

GRADE: **B**; PRICE: $150 street; Lifetime Keyboard (wired); $99 street; Key Tronic Corp.; 800/262-6006.

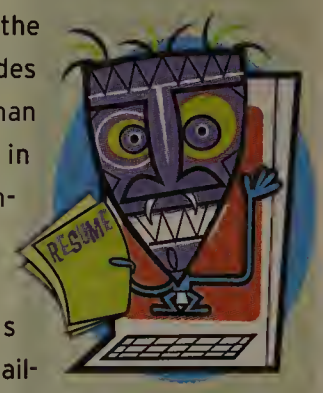
READER SERVICE NO. 738

LOOK MA, NO WIRES: Key Tronic's infrared keyboard and mouse.

KEEPING UP

The Upside of Downsizing

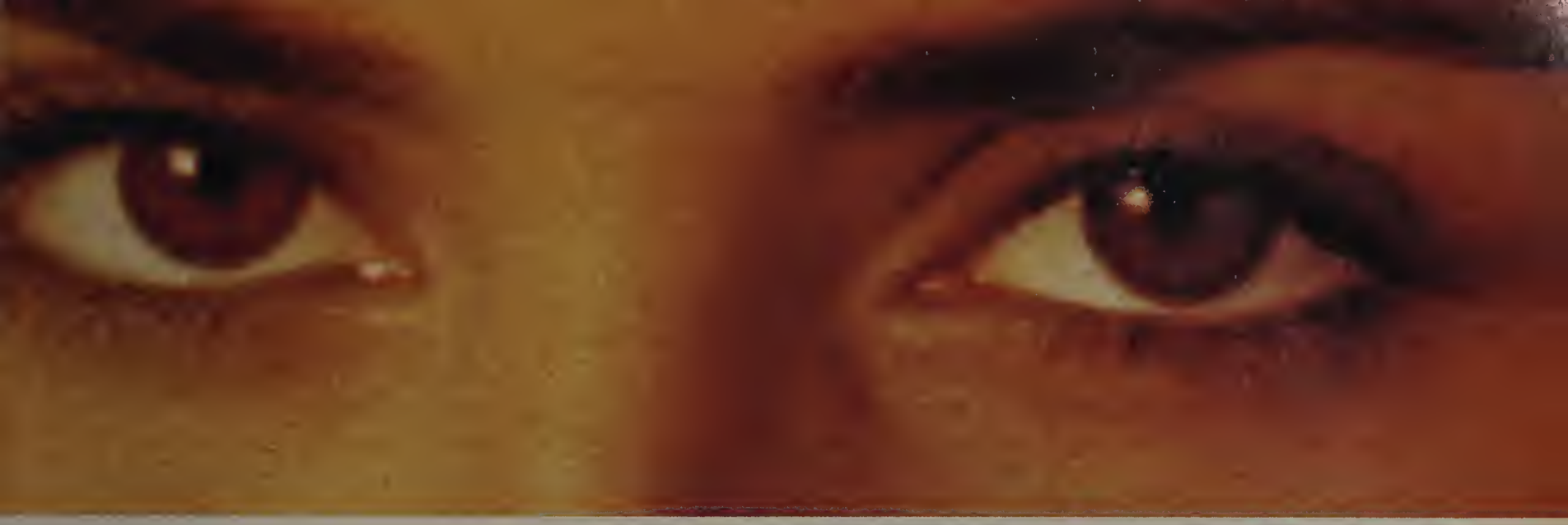
CORPORATE DOWNSIZING got you down? Check out the **Monster Board** (http://www.monster.com) for help in finding the job of your dreams—or at least something that'll help you pay the bills. The site includes postings on more than 55,000 positions in companies throughout the United States. If you find a job that interests you, you can get detailed information about it and the company. Alternatively, you can post a résumé online and hope the headhunters find you.



Bye-Bye Bundles

AFTER YEARS OF throwing anything and everything onto the hard disk, some home PC makers have decided it's time to scale back on the software they bundle with their computers. **Compaq Computer**, one of the first companies to make the change, is dropping about one-third of the titles bundled with its Presario line. Machines released this fall will have fewer than 20 titles, compared to the 30-plus included on earlier models. **Acer, Packard Bell, and NEC** are making similar cuts. The reason? All those titles add about $200 to the cost of a PC, and with price competition so intense, PC companies are desperate to cut costs. **Hewlett-Packard**, though, seems to be bucking the cost-cutting trend. The latest Pavilion home PCs now come with roughly 40 CD-ROM titles.

PHOTOGRAPH: KEVIN CANDLAND ; ILLUSTRATION: CHIP WASS



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But that's not the only place we make the competition look bad. Let's take a look at viewable image size. Our S17 provides a full 16" of viewable image size and also features a sharper dot pitch than Samsung, NEC and Nokia. And with our high refresh rates, the result is one of the sharpest images available.

That's why *PC World* named the S17 its **Best Buy** for 17" monitors.*** And if it's multimedia you're looking for, check out our PanaMedia™ Series. They feature all the advantages of the S17 with built in stereo speakers and microphone.

Model	Dot Pitch (mm)	Max. Res. (H x V)	H-Scan (kHz/NI)	Viewable Area	Warranty (Years)	ARP*
PanaSync S17	0.27	1280x1024	30-69	16.0"	3/1 Swap	$650
NECXV17+	0.28	1280x1024	31-82	15.6"	3	$799
Samsung 17GLi	0.28	1280x1024	30-65	15.75"	3	$645
Nokia 447L	0.28	1024x768	31-64	15.63"	3	$674

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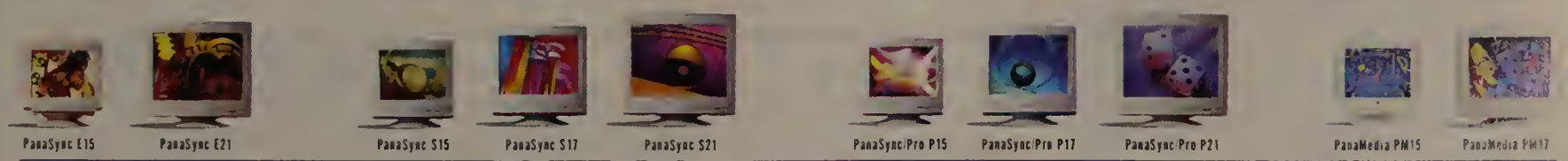

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*Average retail price for all competitive models provided by ARS, Inc. as of July 31 1996 **September 1995 ***September 1996
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MN13-PCWO

Circle 166 on reader service card

THE GRAIL GAME

IF THE KNIGHTS WHO SAY NI mean anything to you, **Monty Python and the Quest for the Holy Grail** is a must-have. Python fans will spend hours boiling their bottoms over their favorite outtakes from the film, playing silly games along the way. Everything about this disc is funny, even the "registration" questions. You can shoot down coconut-carrying sparrows or play Catch the Cow at the Castle Liombardi (move fast, lest your knight be squashed by airborne bovines). If you're willing to shelve political correctness, play Spank the Virgin or Burn the Witch. Find the elusive Grail and you'll be rewarded with an animated scene from the original film, "King Brian the Wild." Like its predecessor, this disc is A Complete Waste of Time. But in the world of CD-ROMs, that's pretty high praise. —*Bronwyn Fryer*

7TH LEVEL'S NEW MONTY Python game is a real 'Ni' slapper.

Monty Python and the Quest for the Holy Grail

GRADE: **A**; PRICE: $49.95 list; 7th Level; 800/979-8466; Windows 3.*x*, Windows 95.

READER SERVICE NO. 741

THE WIDE WORLD OF WALDO

EVER CAUGHT YOURSELF squinting at a page of minuscule cartoon characters, seeking a bespectacled figure in a striped shirt? Well, **Where's Waldo? Exploring Geography** raises the stakes a bit. Your quest is to save the Wacky World Wide Games by locating him—and some athletes who've gone missing. Geared to 5- to 12-year-olds, the disc is full of colorful graphics and cheerful dialog. As you search each continent, you must identify countries and flags, determine the fastest method of transportation, and examine clues to cultural icons. Unfortunately, the games quickly become redundant, and the activities sometimes distract from what's being taught. Perhaps the greatest frustration, though, is the game's slow performance, even on a Pentium-90. —*Anne Kandra*

Where's Waldo?

Exploring Geography GRADE: **B-**; PRICE: $29.95 list; WarnerActive; 800/693-3253; Windows 3.*x*, Windows 95.

READER SERVICE NO. 742

DESKTOP GROUND CONTROL

DID YOU KNOW that the first space traveler was Laika, a Soviet dog? You'll be surprised at what you learn with **Eyewitness Encyclopedia of Space and the Universe**. Journey to the moon's dark side or through the star dome. Interested in early rockets or space wear? Check out the technical manual. And the video clips and audio snippets are very cool: They include Sputnik transmissions, Radio Moscow broadcasts, and conversations with moon-walkers. The interface is friendly and the range of topics impressive, but the subject matter is somewhat simple—it's for kids as well as adults. Pity—I was rather hoping to see Martians on video. —*Aoife McEvoy*

Eyewitness Encyclopedia of Space and the Universe

GRADE: **B**; PRICE: $40 street; DK Multimedia; 800/356-6575; Windows 3.*x*, Windows 95.

READER SERVICE NO. 743

KEEPING UP

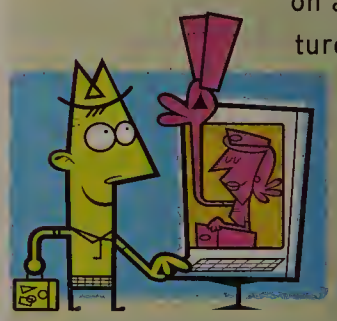
Where's the On Button?

ALTHOUGH 94 PERCENT of all elementary school teachers believe PCs are powerful tools for classroom learning, only 55 percent of the 1000 kindergarten through sixth-grade teachers surveyed said they'd received enough training to feel comfortable with the technology. Other grim stats: Just 14 percent of U.S. classrooms have more than four computers for the entire class to share, and only 6 percent say they can access the Internet from school, according to the surveyed teachers. Anyone for Net Day '97?

SOURCE: 1995 TENTH PLANET TEACHERS & TECHNOLOGY SURVEY

The Skies Just Got Friendlier

Do you need to check an airfare to Dallas or Boston? Want to see if your flight really is leaving on time? If you're a frequent traveler on American Airlines—or if you're just interested in checking out flight information—stop by the company's new and improved Web site (http://www.americanair.com). You'll be able to get quick fare quotes, check on arrival and departure times, and most recently, purchase tickets. Until December 31, 1996, AAdvantage frequent fliers will receive 500 bonus miles for each round trip they purchase on the Web and complete on American Airlines or American Eagle. Another neat feature: You can subscribe to NetSAAvers, a weekly online mailing list detailing last-minute discounted fares. **–Roberta Furger**



IT'S PARTY TIME!

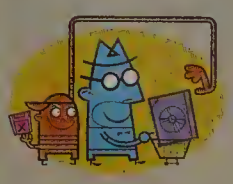
PLANNING A KID'S birthday party? Check out PrintPak's **Party-Fun Kit**, a crafts kit and CD-ROM that helps kids age five and older make everything from invitations to birthday banners. You get paper bags, sticker paper, envelopes—even perforated card stock for making sunglasses. It's fun, easy, and a great way to put your color printer to use. —*Roberta Furger* ■

Party-Fun Kit

GRADE: **A**; PRICE: $24.95 list; PrintPak; 800/774-6860; Windows 3.*x*, Windows 95.

READER SERVICE NO. 744

F Y I



61 percent of consumers surveyed by the Software Publishers Association say they bought a new game or entertainment CD-ROM in 1996. Another 21 percent said they copied a new game from a friend or coworker. Copying is most common among households with teenagers.

SOURCE: 1996 SPA CONSUMER SURVEY

ILLUSTRATIONS: CHIP WASS

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Circle 212 on reader service card

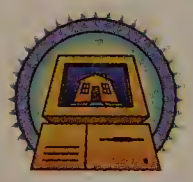
PC WORLD

TOP 5 HOME PCs

	SYSTEMS	Street price (8/2/96)	Overall rating	PC World-Bench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	Gateway 2000 P5-166 Family PC 800/846-2000 http://www.gw2k.com	$2444	75	199 outstanding	fair/ good	good	**FEATURES:** P-166, 16MB of RAM, 2.5GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem with voice mail, 17-inch monitor, 16 home software titles. **PROS/CONS:** Very fast, good price, big hard drive, big monitor, a real workhorse. Available only through mail order. Challenging assembly and so-so reliability rating.	733
2	Compaq Presario 4712 800/345-1518 http://www.compaq.com	$2698	74	188 very good	good/ good	good	**FEATURES:** P-166, 24MB of RAM, 2.5GB hard disk, 6X CD-ROM drive, 33.6-kbps fax-modem with voice mail and speakerphone. **PROS/CONS:** Great home office communications center with control panel on case for voice mail, speakerphone, and audio CD. Slightly high price and limited software package.	734
3	IBM Aptiva C65 800/426-7235 http://www.ibm.com	$2908	74	185 very good	fair/ good	good	**FEATURES:** P-166, 16MB of RAM, 2.1GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem with voice mail, speakerphone, and DSVD. **PROS/CONS:** Solid home system, very fast, nice interface with easy setup. Great software package includes Lotus SmartSuite, Microsoft Works, and Quicken. Expensive.	–
4	Quantex QP5/120 M-3 800/896-4898 http://www.quantex.com	$2049	73	187 very good	poor/ fair	good	**FEATURES:** P-120, 32MB of RAM, 512K cache, 2.5GB hard disk, 6X CD-ROM drive, 28.8-kbps fax-modem with voice mail, 17-inch monitor. **PROS/CONS:** Fast muscle machine with extra memory and cache, large hard drive, big monitor, great price, and good software package. Mediocre reliability and service scores.	736
5	NEC Ready 9617 800/632-4636 http://www.nec.com	$2448	72	152 good	fair/ poor[1]	very good	**FEATURES:** P-133, 16MB of RAM, 1.6GB hard disk, 6X CD-ROM drive, 28.8-kbps fax-modem with voice mail and speakerphone, handheld remote control for telephony and audio CDs. **PROS/CONS:** Easy setup, good communications features, wavetable sound; software includes Microsoft Works and NASCAR Racing. So-so performance.	737

Best Buy http://www.pcworld.com/top5soho

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC WorldBench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service survey. [1]Limited data; score is based on responses for this company and the average of all companies. FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 911.



OUT WITH THE OLD, in with the new: Competitive prices, solid service, and changing product lines were the factors that pushed four new systems into this month's Top 5. In late summer Compaq, Dell, and Hewlett-Packard discontinued their aging home systems to make room for fresh product lines. Filling the void are new systems from Compaq, IBM, NEC, and Quantex.

Only Gateway 2000's P5-166 Family PC survived from last month's chart, taking the top spot this month. The P5-166 is a fast muscle machine that comes with a 17-inch monitor and a 2.5GB hard drive.

In second place is Compaq's Presario 4712. Armed with 24MB of RAM and a 166-MHz Pentium processor, the Presario offers a bounty of features, including controls for a speakerphone, an answering machine, and an audio CD player, plus the ability to receive videophone calls.

IBM's P-166–based Aptiva C65 has a mediocre reliability score and a hefty $2908 price, but it flew through our test suite, outscoring some very speedy machines to land in third place. You may be tempted to put the C65 in your kitchen, though; it looks more like a food processor than a PC.

The other two newcomers are from Quantex and NEC. The affordable Quantex QP5/120 M-3 turned in fast PC WorldBench scores that were neck and neck with those of the P-166s. In past months a lack of user-friendly features—and lower reliability scores—put other Quantex models in the rear of the pack. But an improved design and easier setup, combined with impressive performance and a low price, landed the QP5/120 M-3 much closer to the top.

And while NEC gets poor marks for service, its Ready 9617 P-133 model offers solid performance and a nice telephony package, including a speakerphone, voice mail, and a handheld remote control that also handles audio CD playback.

One system we tested that didn't make the Top 5 is the AST Advantage Adventure 4100. At $997, the 4100 comes with an AMD DX4-100 processor and only 8MB of RAM. But it's fine for simple word processing or surfing the Net.

—Kirk Steers ■

IBM'S P-166–BASED APTIVA C65 is a fast system with a hefty $2908 price.

Kirk Steers is a contributing editor for PC World.

ILLUSTRATION: JEFFREY PELO

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PC WORLD TOP 10 Monitors — CHIP TIP Juli 1995

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You Win 95, I'm Switching

WHEN I WAS A KID, I hated jumping into a pool of cold water. It's no different today, except the pool's deeper, murkier, and way colder. That's right: It's Windows 95, and I finally took the plunge. I learned some things from my experience, and I'd like to give you some important advice.

I always felt that Microsoft could go its way and I could go mine, but things changed when they started hyping and bullying me into upgrading to Win 95. I hate being told what's good for me, especially by Microsoft. And while I grant you that's no reason not to upgrade, Windows 3.*x* really did do everything I needed.

But I finally decided to upgrade because enough intriguing products—Diamond's cool Supra NetCommander ISDN modem, for example—run only in Win 95. Just as important, Microsoft's collection of fixes and patches, strangely named the Windows 95 Service Pack 1 Update, became available (http://www.microsoft.com/msdownload). And I figured that hardware vendors would have found the time to debug their drivers by now.

I anticipated plenty of *tsuris* (that's Yiddish for grief) installing Win 95, and I wasn't disappointed. I upgraded two machines, and each developed a hardware glitch that wasn't there before. One got confused by an old MediaVision sound card, and the other refused to recognize a SCSI-based CD-ROM drive. Here are some tips for making a smoother transition than I did.

TAKING PRECAUTIONS

FIRST, BUY A WIN 95 BOOK—that's right, printed on paper; you know, bound? The two books I think are worth their weight in gold: *The No B.S. Guide to Windows 95*, by fellow *PC World* Contributing Editor Scott Spanbauer (No Starch Press, 1996, 800/420-7240), and Brian Livingston's *Windows 95 Secrets* (IDG Books, 1995, 800/762-2974).

Also, make sure you resolve any Windows 3.*x* issues *before* you upgrade. If your system's flaky now, don't expect Windows 95 to solve the problem.

More than likely, any problems you have will be driver related. Play it safe: Go through your purchase records (or simply open up your computer) and make a list of all the peripherals in your system—including the models and the version numbers. Then head for Frank's Windows 95 Driver Updates (http://www.conitech.com/windows/win95.html), a terrific Web site listing over 660 companies offering Win 95 drivers.

If you're like me, you're going to stick with **Win 95** (yes, **Virginia,** there is life after **3.x**).

If you've got an old or bizarre card in your system that you can briefly live without (*not* a video or disk controller card), consider pulling it out before upgrading. Once you have Win 95 up and running, shut off the machine, stick the card back in, and give the Control Panel's *Add Hardware* option a chance to examine the card. That's how I got a MediaVision sound card to work properly.

I can't emphasize enough that you *must* have a bootable DOS disk prepared. Include all your critical files—autoexec.bat, config.sys, sys.com, as well as any drivers (especially for your CD-ROM drive) you'll need to get your system running.

Now it's time to back up your system. Double-check the backup by restoring a handful of files and applications to a new directory. Choose from three different locations on the tape, examine the files, and run the applications.

Next, rename config.sys and autoexec.bat, your two start-up files. Win 95 either doesn't need or can't use your old memory managers, virus detection programs, or TSRs; it has its own methods and requirements. As Win 95 installs, you'll find out quickly enough whether you have to add anything back. In my case, I had to temporarily add back the drivers for my SCSI card to get the CD-ROM drive to work. Once it was running, I could concern myself with finding faster, more reliable drivers designed for Windows 95.

LOCATION IS EVERYTHING

YOU'LL ALSO HAVE to choose between installing Windows 95 into a new directory—oops, *folder*—or over your existing Windows. I say, go for broke. If you're like me, you're going to stick with Win 95 (yes, Virginia, there is life after 3.*x*). The good news, is all your old applications will still be there, ready and waiting. And in the worst case—say, an old DOS app won't run—you can uninstall Win 95 using the Start Up disk.

For me, the dust has finally settled: I'm using Windows 95 and honestly, I'm glad I switched. I'm more productive because I can load lots more apps and get quicker access to them, and I have fewer system crashes. In fact, if Bill Gates ever invites me to lunch, I may even thank him. ■

Steve Bass is a contributing editor for PC World *and a licensed marriage and family therapist and president of the Pasadena IBM Users Group.*

ILLUSTRATION: CHIP WASS

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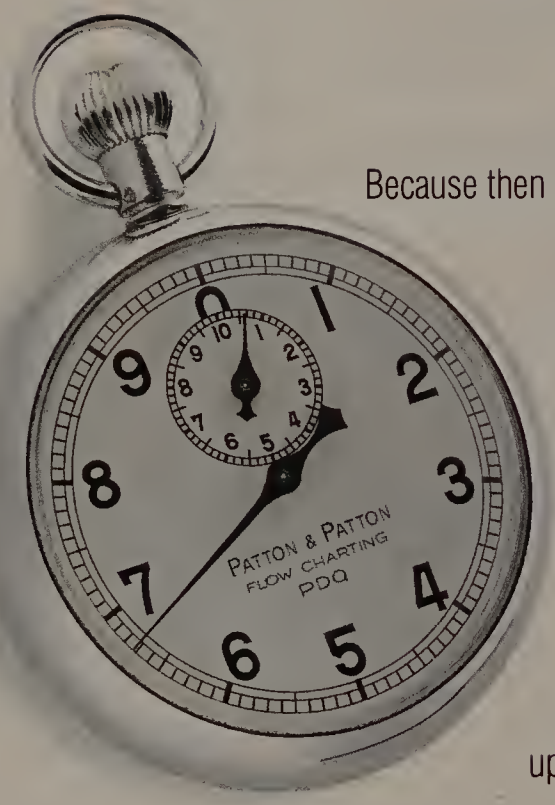

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I N S I D E

M2 20 CD-ROMs Under $25
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M7 Title Reviews
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Top 5 CD-ROM drives and sound boards.

M17 Q&A
Readers get solutions to multimedia woes.

20 CD-ROMs Under $25

Budget doesn't have to mean _boring_. From classic games to indispensable reference works, these 20 titles give you a lot of value for little money.

BY EAN HOUTS, DIANE MEHTA, AND RICHARD POPKO

THE LATEST AND GREATEST CD-ROM TITLES—the ones that cost 60 bucks a pop—aren't the only discs that can make you laugh, scream, cry, or roar. While prices are generally dropping, the average is still about $40 for new discs. But we found top-shelf multimedia titles, including four CD-ROM magazines, that cost less than what you'd pay for four movie tickets. And most give you more bang for your buck than a trip to the cineplex.

Ean Houts is a quality assurance engineer at Quintus Corporation, Richard Popko is a news and technologies editor at DV *magazine, and Diane Mehta is an associate editor for* PC World.

ENTERTAINMENT

FULL THROTTLE

AS BEN, LEADER OF the Polecats, the baddest biker gang around, you ride a Corley—one of the biggest, meanest bikes on the road. Your tough-guy persona seems to invite trouble—specifically, a murder charge alleging that you sent Malcolm Corley, Corley Motors' CEO, to an early grave. The animation, great dialog, and hard-driving rock sound track make this adventure disc one of the best around. Despite the excessive length and poor synchronization of the chopper fights, Full Throttle is still king of the road. —*E.H.*

$24.99 list; LucasArts; 800/985-8227.

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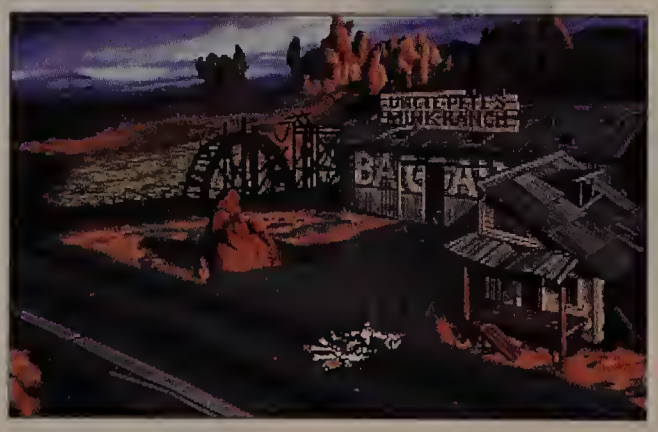


BAD BEN ON A BIKE looks like he owns the road—because he does.

REBEL ASSAULT

IF RECENT TALK of another *Star Wars* movie has you primed for some fast and furious Jedi action, the original 1994 Rebel Assault should tide you over for a while. Don't miss the chance to confront the gamut of Imperial enemies. Rebel Assault has more plot than you can shake a blaster at. —*E.H.*

$24.99 street; LucasArts; 800/985-8227.

READER SERVICE NO. 612

SAM & MAX HIT THE ROAD

IMAGINE A SLIGHTLY mellow Ren & Stimpy careening around the country in search of Bigfoot. That, in a nutshell, is Sam & Max Hit the Road. The daring but dorky twosome are detectives out to crack the case of the missing Sasquatches. The big bonus in this goofy adventure is the funny dialog. —*E.H.*

$14.95 list; LucasArts; 800/985-8227.

READER SERVICE NO. 613

SID MEIER'S CIVILIZATION

THIS RELEASE FROM 1991, rated as one of the best of its time, sold more than 850,000 copies. The ratio of price to fun is unbeatable. Establish your empire and develop new technologies as you create cities and build your armed forces. Then grind rival peoples under your heel and crush their puny civilizations! There's also a multiplayer version, Civnet, and a revamped update, Civilization II. —*E.H.*

$24.99 street; Microprose; 800/695-4263.

READER SERVICE NO. 614

SIMCITY CLASSIC

MAXIS HAS A SIMULATION game for just about everything, but this one is a big winner. Originally released on floppy but now available on CD-ROM, SimCity Classic is the ideal mix of complexity and gaming—a combination strong enough to make you tolerate the circa-1989 graphics. Altogether, the CD, floppy, and Nintendo versions have sold 3.2 million copies. SimCity lets you build the largest, best-planned city you can imagine; too bad you can't live in it. —*E.H.*

$14.95 list; Maxis; 800/336-2947.

READER SERVICE NO. 615

MUSIC

SOUL ALMIGHTY: THE FORMATIVE YEARS, VOL. 1

BOB MARLEY MAY BE GONE, but he's not forgotten by his legions of fans. The dreadlocked King of Reggae lives on in this new enhanced CD-ROM. The disc contains four previously unreleased Marley recordings done from 1967 to 1972. You can listen to both restored

and unrestored versions of the songs, yielding an interesting comparison. You can also browse the pictures and interviews with Marley associates. All reggae fans should gobble this up. —*E.H.*

$17.98 list; JAD Records; 310/552-0010.

READER SERVICE NO. 616

GO BIG

ALTERNA-SPORTSTERS will be thrilled with Go Big. Watch footage of skinny punkers on snow- and skateboards, peruse articles from *Thrasher* and *Slap* magazines, and tangle with irritatingly oblique navigating icons. Don't bypass the audio tracks, which unfortunately can be a chore to pinpoint in the murky interface. The featured bands include Sausage (with Les Claypool of Primus), 311, Porch, Laundry, Eskimo, Sublime, Shelter, and MIRV. —*D.M.*

$15.98 list; OM Records; 415/247-5832.

READER SERVICE NO. 617

WASTE TIME, listen to punk, and skate away with Go Big's odes to youth culture.

TALES FROM THE PUNCHBOWL

PRIMUS'S ENHANCED CD, Tales from the Punchbowl, is surreal and wacky, irreverent and funky. The disc is replete with the craziness of hard-core punk. At the helm of an interactive tugboat, you steer toward icons that launch band-drawn animations with music videos. Watch out for endless Pong games and other strange visual effects. You can go to the pool, billiards, or drum room for further entertainment. Appreciation of Primus is mandatory for maximum enjoyment of this disc. —*D.M.*

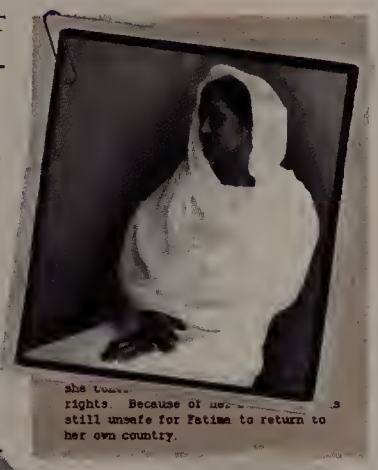
$15.98 list; Interscope Records; 800/807-2696.

READER SERVICE NO. 618

REFERENCE

AMNESTY INTERACTIVE

THIS COMPETENT introduction to Amnesty International's human rights work features stories told by persecuted (and formerly persecuted) individuals from around the world, including the last president of Czechoslovakia, Vaclav Havel, and people from Cape Town, South Africa. The disc is stocked with photos, audio, and many well-done animated movies that supplement the text. The time line and the coverage of the Universal Declaration of Human Rights (adopted in 1948 by the United Nations) are the disc's strongest elements. The former chronicles contributions of major thinkers and activists to the human rights movement, while the latter provides an overview of the Declaration's 30 articles. —*D.M.*

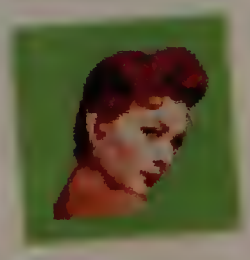


$10 list; Voyager; 800/446-2001.

READER SERVICE NO. 619

BERNARD OF HOLLYWOOD'S PIN-UPS

FANS OF THE FABULOUS '40s and '50s will love browsing photographer Bruno Bernard's now-campy images of the period's glamour gals. The disc organizes photos, videos, poetry, and the famous pin-ups themselves based on the models' hair color—blonde, red, or brunette. The CD-ROM is almost worth the 22 bucks just for some of the quotations, such as Brigitte Bardot's "I am not an actress; I am a phenomenon." —*D.M.*



$21.99 list; Corel; 800/772-6735.

READER SERVICE NO. 620

BEYOND THE NINE DRAGONS

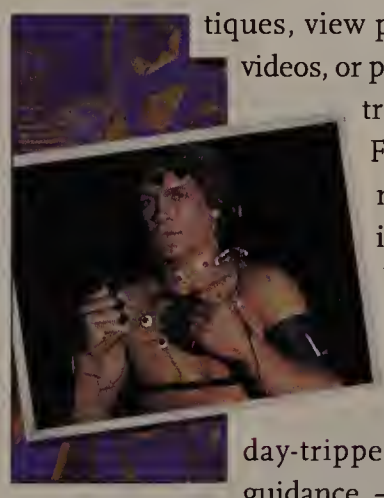
THIS COLORFUL, INFORMATIVE introduction to the indigenous folk cultures of the Mekong River in Southeast Asia—including Vietnamese, Cambodian, Laotian, Thai, and Chinese peoples—offers plenty of slides, audio, and video, plus historical material that will keep you occupied for days. The Explorer's Guide, with its extensive country profiles and travel information, should inspire a long and memorable vacation. —*D.M.*

$9.99 list; Essex Interactive; 201/894-8700.

READER SERVICE NO. 621

BLOCKBUSTER GUIDE TO MOVIES & VIDEOS

OVERWHELMED BY THE sheer number of possibilities at the video store? This guide offers reviews, biographies, historical commentary on film genres, and a strong search engine that covers everything from horror films to art house classics. You can read reviews, listen to audio critiques, view photos and videos, or play a movie trivia game. Film buffs may not be impressed, but this is a valuable reference for video day-trippers seeking guidance. —*D.M.*



$19.99 list; Creative Multimedia; 800/262-7668.

READER SERVICE NO. 622

COMPLETE SHAKESPEARE COLLECTION

THE BARD'S FANS will find this collection of dramas and poetry indispensable. You get plenty of illustrations, but the disc offers only one measly video—a big oversight considering the multitude of possibilities for showing traditional and contemporary interpretations. Still, given the inclusion of the complete plays, long poems, and sonnets, plus critical material, 'twould be knavery to cavil. So fine and fair a disc I have not seen. —*D.M.*

$21.99 list; Corel; 800/772-6735.

READER SERVICE NO. 623

LOOKING FOR a used roadster or a shiny new Acura? Consumer Reports has 'em all.

CONSUMER REPORTS CARS

FEW TASKS IN LIFE ARE as intimidating as buying a car, so arming yourself with tips from a powerful consumer watchdog group helps lower the fear factor. The disc defines such obscure terms as "rack and pinion" and identifies cars that meet your needs and budget. It sheds light on everything from reliability and recalls to child seats and auto loans. The CD-ROM would be a steal if it ran more quickly and had reliable audio. —*D.M.*

$19.99 list; Creative Multimedia; 800/262-7668.

READER SERVICE NO. 624

INTERACTIVE WINE CELLAR

CAN'T TELL THE DIFFERENCE between Chablis and chardonnay? This guide's for you, then. Grape-by-grape descriptions of white, red, blush, and sparkling wines are useful for connoisseur wanna-bes. The audio and video aren't drop-dead fascinating, but the disc provides a useful survey of basic concepts, such as why wine is aged. —*D.M.*

$14.95 list; Wiz Technology; 800/366-4830.

READER SERVICE NO. 625

WORLD'S GREATEST CLASSIC BOOKS

ALTHOUGH THIS TITLE is great as a reference tool and useful for its videos, don't expect everything you might seek on every writer imaginable—it overlooks some major poets. The disc is handy for annotating scholarly documents and is essential for comprehensive subject and author searches. If you need to quickly call up a list of works by Euripides, it's a lot easier to check here than to go to the library and start digging. —*D.M.*

$21.99 list; Corel; 800/772-6735.

READER SERVICE NO. 626

CD-ROM MAGAZINES TALK BACK

What's the main difference between a print magazine and a CD-ROM publication? Except for scratch-and-sniff perfume ads, you can't interact with print zines. Here are a few hip CD-ROMs you'll find on the shelves.

BLENDER

Blender combines the musical depth of *Rolling Stone* with the breadth of *Entertainment Weekly.* In the Fixtures section, you'll get the lowdown on the latest movies, plus punchy reviews of the newest video games and recording artists. With content similar to Launch (see below) but sporting a friendlier interface, Blender's strong suit is music. The most intriguing section is Friction, which humorously addresses sex, death, religion, and politics. *–R.P.*

"ARE WE NOT MEN? We are Devo." Blender offers celebrity interviews of cult bands.

$29.95 for six issues (bimonthly); Dennis Publishing; 212/302-2626.

READER SERVICE NO. 627

DIGIZINE

If you're a fan of irreverent, 20-something publications, Digizine is right up your alley. Stories cover trendy fashions (with spotlights on undiscovered designers), unknown "cutting-edge" bands, and profiles of interesting people who haven't quite broken into the mainstream, such as Heather McAdams, underground cartoonist extraordinaire. Digizine sports a creative interface that seamlessly blends color, style, and interactivity into one digestible package. *–R.P.*

DIGIZINE SPOTLIGHTS the nonlinear storytelling of cartoonist Heather McAdams.

$29.95 for four issues (quarterly); Ahrens Interactive; 800/908-7245.

READER SERVICE NO. 628

GO DIGITAL

Though best described as R-rated, Go Digital offers more than pictures of nude women. It also serves up stories about the coolest toys that money can buy (like the latest in virtual reality headgear) and such manly activities as shark hunting and roller hockey. You also get interactive pictorials replete with tastefully shot photos and video. While the content isn't exactly thought-provoking, the design is clear and easy to navigate. *–R.P.*

$29.95 for four issues (quarterly); ElectroMedia; 800/572-3766.

READER SERVICE NO. 629

LAUNCH

Mix *Spin* and MTV, and you get Launch. This zine brings you the world of pop-culture music, garnished with a dollop of movies and games. You'll find in-depth interviews with contemporary rock musicians, irreverent cartoon shorts, and a behind-the-scenes look at Hollywood films in production. But its strongest section is Vibreaker, an interactive jukebox that spotlights 20 bands, each of which offers three abridged songs from its latest album. *–R.P.*

$35.99 for six issues (bimonthly); 2Way Media; 800/955-2862.

READER SERVICE NO. 630

Is Your Computer Sound Asleep?

HERE'S YOUR WAKE-UP CALL. Yamaha **WAVEFORCE** sound upgrade cards will shock your old sound card to life like six cups of double espresso, double caff.

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Hind Versus Longbow: Attack of the Copter Sims

ENTERTAINMENT

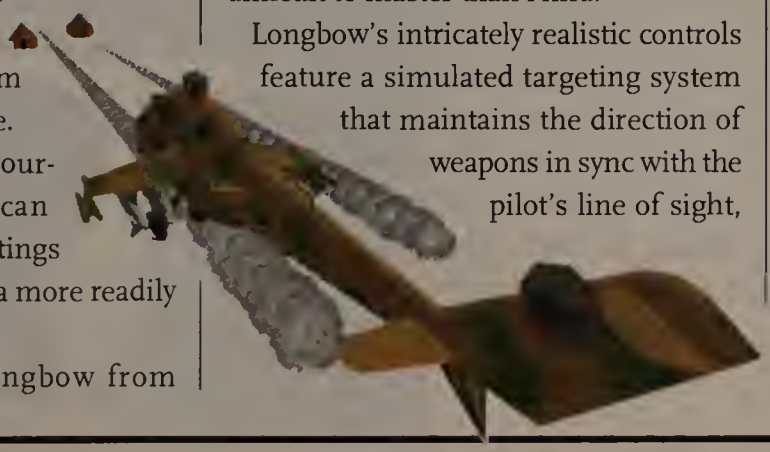
WITH THE END OF the Cold War, it's unlikely that the U.S. AH-64D Longbow helicopter and the Russian Mi-24 Hind will ever meet in combat. But two new simulations, **Hind** and **Longbow**, let you take the controls to see how each might fare in a real-world fight.

WHEN YOU'RE AT THE HELM of the Hind helicopter (above), stealth and precision are keys to survival. Longbow has detailed controls.

Hind, the highly anticipated sequel to Interactive Magic's Apache simulation, is a worthy sequel to its popular predecessor. Hind and Apache connect to each other via modem for head-to-head fighting. Players can also fly cooperatively in two helicopters, or even as two crew members in the same Hind—the pilot and the weapons system operator. The multiplayer capabilities don't end there: Hind has its own Doomlike Death Match for up to 16 players on a network. Some virtual pilots may choose Hind over Longbow on the strength of these modem and network features alone.

You've never strapped yourself into a copter? You can adjust Hind's difficulty settings from arcade level down to a more readily manageable standard.

In another class is Longbow from Jane's Combat Simulations, a subsidiary of Electronic Arts. The premier standalone helicopter simulation on the market, it re-creates the Longbow with painstaking accuracy, relying on Jane's exceptional database of the world's machines of war. The one drawback of this sim is that it lacks any multiplayer option. Anyone who wants to face live opponents via network or modem will have to fly elsewhere.



Longbow players can fly missions based on real-world U.S. Army combat in Panama and Iraq, or they can choose to wage fictional campaigns inside the former Soviet Union.

Modern sims present a steep learning curve. Happily, Longbow sports not only extensive documentation and online source material from Jane's, but also a virtual flying instructor to guide you. Even so, Longbow is significantly more difficult to master than Hind.

Longbow's intricately realistic controls feature a simulated targeting system that maintains the direction of weapons in sync with the pilot's line of sight, as well as a night-vision infrared display. The disc uses state-of-the-art SVGA graphics and features 20,000 kilometers of battlefield based on U.S. Geological Survey terrain maps. If you don't care about absolute accuracy and want to increase the game's speed, you can adjust the level of graphical detail.

Longbow shines when you're flying 150 feet above the ground, using hills to screen your aircraft from enemy radar. You get a taste of copter warfare when you pop your Longbow above the hills, launch missiles, then drop from sight.

Of course you need plenty of power to get this bird off the ground: at least a Pentium-90, 97MB of hard drive space, and a fast video card à la STB Lightspeed 128 or Matrox MGA Millennium.

So which sim to choose? Compared to the stunning scenes in Longbow, Hind's visuals are uninspired. You get some texture-mapped graphics, but you see plenty of shaded polygons, which cause Hind's terrain to appear rather abstract.

The upside, however, is that you can fly Hind on a 486-66 with ease. Even 486-33 owners shouldn't have trouble if they use the lowest detail settings.

If you demand multiplayer options, Hind offers the LAN play you crave. But if a graphically rich and intricately detailed sim is more to your liking, Longbow wins the battle. —*Bernard Yee*

Hind

$49.95 list; Interactive Magic; 800/789-1534.

Grade: **B+**

READER SERVICE NO. 745

Longbow

$59.95 list; Electronic Arts; 800/245-4525.

Grade: **A-**

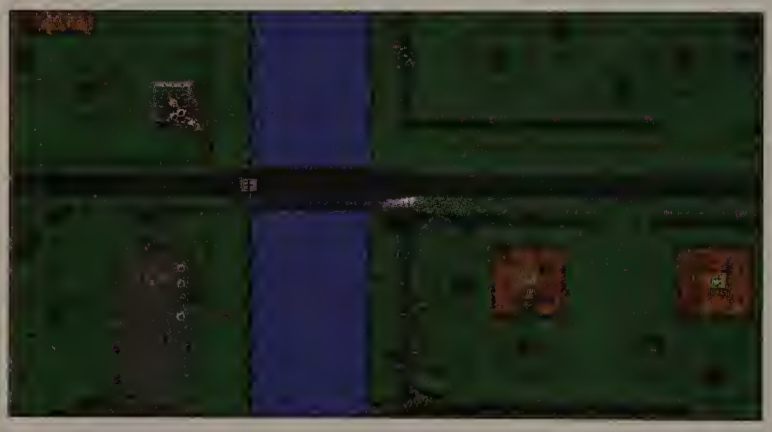
READER SERVICE NO. 746

NOT ALL THAT IT CAN BE

BOTH CASUAL AND hard-core war gamers will love the realism and pulse-pounding excitement of **Close Combat**, a new CD-ROM strategy title from Microsoft. But the mediocre graphics and the general dearth of advanced features left me hungry for more.

Designed as a digital version of the popular board game Squad Leader, Close Combat puts you in command of troops in France during World War II. If you like the board game, you'll enjoy this disc.

You issue orders and fight across finely detailed (but aggravatingly small) graphics of hedgerows, fields, roads, and stone walls as you accomplish various battle missions. The interface, which is divided into several areas, includes an overhead view of the battlefield, stats on your troops, and a zoom window.



DETAIL AT A DISTANCE: Close Combat looks like a war between high-tech ant colonies.

You'll need every bullet and shell at your disposal, because real-time combat makes this game a challenge, and controlling multiple assaults simultaneously is difficult. Fortunately, excellent sound effects—stuttering machine guns, screams of the wounded and dying—clue you in to what's going on.

Close Combat isn't your run-of-the-mill tactical war game: You can track the physical and mental status of your entire squad rather than just individual soldiers. If the troops suffer from illness or poor morale, they'll sit tight. Their performance depends in large part on your leadership skills: Order them to assault a heavily fortified position without tactical assistance, and they will probably not comply. Give them supporting fire and some smoke to remain hidden from the enemy, and they'll forge ahead. This intricacy creates an entirely new challenge and adds an element that's missing from most titles in the genre.

But the disc should provide more. More varied terrain, more types of units, better graphics, and a scenario editor would bring Close Combat closer to its solid potential. —*Ean Houts*

Close Combat

$44.95 list; Microsoft; 800/882-8080.

Grade: **B**

READER SERVICE NO. 747

MURDER IN SANTA FE

THE ELK MOON MURDER, Activision's first installment in its new Santa Fe Mysteries series, is a classic whodunit with clever scripting and fine acting by Amanda Donohoe of *L.A. Law* fame.

In the picturesque red-clay hills of Santa Fe, New Mexico, one of the community's most revered Native American artists has been murdered. You and your detective partner must find the killer before anyone else is slain.

After conducting a few interviews, you realize that just about everyone in the town had a motive for committing the crime, so you must dig deeper to uncover who had the means to do the deed. The catch is, you have limited time to solve the crime, and each question you ask gobbles a valuable chunk of it. And whenever you order forensic reports or check on someone's alibi, you lose yet more time. Only the most methodical players will uncover enough evidence before the clock runs out to reach the game's frightening climax.

Game freaks beware: The story offers very limited interaction and focuses primarily on the narrative. Similar to the board game Clue, **The Elk Moon Murder** boils down to a simple process of elimination. But the stirring story line will cloud your deductive reasoning and send you down many a false trail before you finally nab the killer.

TIME ISN'T ON YOUR SIDE in The Elk Moon Murder. However, a PDA interface helps you communicate with other investigators quickly.

Using TrueMotion video compression, Activision presents Elk Moon in video sequences so sharp, you can distinguish a cigarette from a white pen. But the game would be more exciting if players could interact with more than one interviewee at a time. Talking to one person from the same camera angle grows tiresome after awhile.

Still, the game offers armchair sleuths an exciting interactive alternative to mystery novels. —*Jeffrey Adam Young*

The Elk Moon Murder

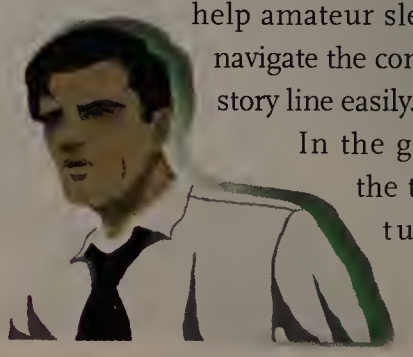
$29.95 list; Activision; 800/477-3650. Grade: **B**

READER SERVICE NO. 748

WAITING FOR SOMETHING BAD TO HAPPEN

YOUR NAME'S MARLOWE, Philip Marlowe. You're a wisecracking, hard-drinking private eye bent on solving a murder.

Based on Raymond Chandler's book *The Little Sister*, **Private Eye** brings the novel's colorful characters faithfully to life. Dossiers, a street map, and a desk diary help amateur sleuths navigate the complex story line easily.



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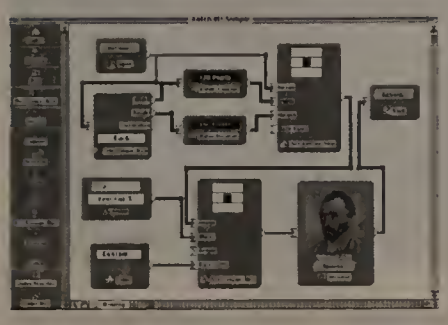

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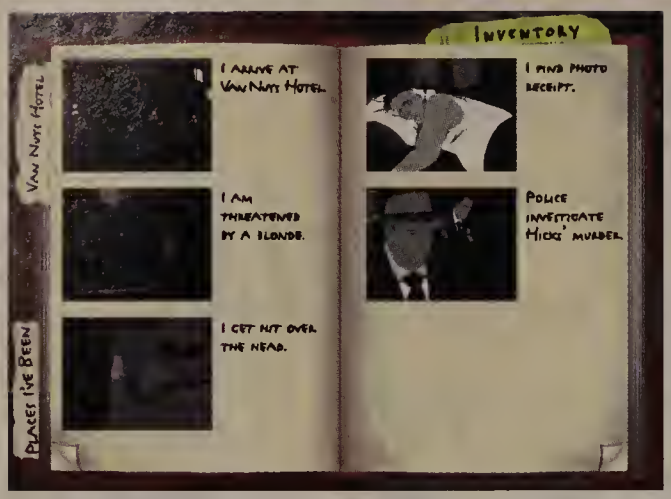


YOU'RE THE DETECTIVE, MARLOWE. Choose the sites you visit carefully, use your moxie, and you'll eventually get to the bottom of this caper.

Orfamay Quest has hired you to find her missing bad-boy brother, Orrin. Naturally, the trail of evidence leads you past knockout blondes and knockout punches. During its numerous video segments, the disc lets you decide how to proceed: where to go, what to ask witnesses, whether or not to arm yourself, and the like.

Your investigation winds through a variety of locales, from Orrin's run-down rooming house to Hollywood's Tantamount movie studio. Unfortunately, once you've chosen a spot, you're stuck: You can't explore another avenue until the scene plays itself out.

The game's hard-boiled characters, darkly rendered scenes, 1940s-style animation (with contemporary three-dimensional graphics), snappy dialog, and atmosphere-enhancing jazz score beautifully uphold the film noir tradition. The game will appeal to Chandler fans and to others who enjoy a mostly gore-free caper now and then. With its variety of possible endings, Private Eye would challenge even Marlowe himself through multiple investigations.

—Stacey Miller

Private Eye

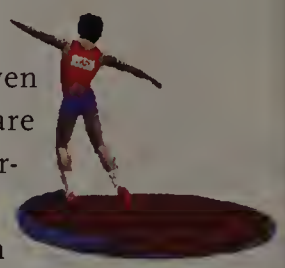
$39.95 list; Simon & Schuster/Byron Preiss Multimedia; 800/223-2336. Grade: **A-**

READER SERVICE NO. 749

READY, SET, RECLINE

DID LAST SUMMER'S Olympics make you wish you'd been flexing more than your typing fingers? Well here's a chance to win the most challenging Olympic event of all without generating a bead of sweat. Unfortunately, however, you might find that watching the Games on the boob tube provided considerably more entertainment than you get playing the **Bruce Jenner's World Class Decathlon** CD-ROM.

No matter what shape you're in, this disc puts you in the role of a world-class athlete competing in each of the decathlon's ten events against seven contenders (the software determines how their performances turn out).



The disc is packed with clever features that allow you to alter game conditions, choose your events, and create a virtual athlete by selecting physical attributes, general skill levels, and various running and jumping abilities.

PC WORLD

TOP 5 CD-ROM DRIVES

		Month tested	Street price	Overall rating	Multimedia performance score	Comments	Reader service number
1	Plextor 8Plex 800/886-3935	Aug 96	$399	90	90	**FEATURES:** 8X internal drive; SCSI bus; caddy-feed mechanism; driver support for Windows 3.1, 95, and NT, and OS/2 and Mac. **PROS/CONS:** Fastest drive tested, two-year warranty, solid design; expensive, SCSI card not included, no weekend support.	726
2	NEC MultiSpin 6V 800/632-4636 http://www.nec.com	Aug 96	$99	90	65	**FEATURES:** 6X internal drive; Enhanced IDE; tray-feed mechanism with clips for side-mounted operation; includes adapter card and cables for Sound Blaster card. **PROS/CONS:** Inexpensive, toll-free phone support; slowest performance in Top 5, no software bundle, no weekend support.	727
3	Sony CSD-880E 800/352-7669 http://www.sel.sony.com/SEL/ccpg	new	$190	89	79	**FEATURES:** 8X internal drive, Enhanced IDE, tray-feed mechanism with clips for side-mounted use; includes adapter card. **PROS/CONS:** Good overall performance, reasonable price, generous daily and weekend support, generous 256K buffer; no bundled software, no toll-free support.	728
4	Teac CD-58E 8X CD-ROM Drive Kit 213/726-0303	Aug 96	$199	88	84	**FEATURES:** NT drivers added, 8X internal drive, Enhanced IDE, tray-feed mechanism with clips for side-mounted use. **PROS/CONS:** Strong performer, reasonably priced; no software bundle, limited 128K buffer, no Mac or OS/2 drivers, no weekend support, no toll-free support.	729
5	GoldStar GCD-R580B 800/243-0000 http://www.goldstar.com	Aug 96	$160	88	77	**FEATURES:** 8X internal drive; Enhanced IDE; tray-feed mechanism with clips for side-mounted operation; driver support for Windows 3.1, 95, and NT, and OS/2. **PROS/CONS:** 11-hour weekday toll-free support, generous 256K buffer; no weekend support, no software bundle, no Mac drivers.	730

Best Buy

TESTED THIS MONTH: THE PINNACLE MICRO 10XTREME is the first 10X drive we've seen. Despite the drive's unprecedented throughput rates (1487 kbps in the CD-Tach benchmark), its sluggish performance in other areas kept it out of the Top 5. The $190 8X Sony CSD-880E mixed low price with decent performance to take the third spot. The Plextor 6Plex and Diamond Multimedia 8X CD-ROM Upgrade Kit, which performed well in last month's Multimedia Special Report ("CD-ROM Drives: Behind the Ratings"), do not appear here because the Multimedia Edition uses different criteria for judging drives. Specifically, our benchmarks focus on random access performance, while last month's Special Report gave greater emphasis to video playback.

HOW WE TEST All drives are tested on a Gateway P5-166XL with 16MB of RAM and Windows 95. At 1024 by 768 at 256 colors, we run: Macromedia Director 5.0 I/O benchmark, Microsoft Encarta 96 script, PowerFinder PhoneDisc 96 timed name search, and MindScape CyberSpeed game installation. We also run a 98-image slide show in Corel PhotoLab and run the CD-Tach low-level CD-ROM benchmark utility. Overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support (10 percent). Higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 910.

DEVELOP YOUR FOREFINGER AND WRIST for the next world decathlon championship.

Then you're ready to train and compete. Altering the player's capabilities changes the outcome of the games. You train your athlete with some multimedia coaching assistance from Jenner, who provides you with a number of tips and strategies for competing in the various events. The photo-realism (right down to the deodorant in the locker room) and the sound clips supply nice extra touches.

Decathlon aficionados should like this sports sim. But for armchair athletes, it's too cerebral and hypothetical. Once you've made your decisions, you passively await the outcome. It's like experimenting in a chemistry lab by watching a beaker bubble for a couple of hours.

In the title screen, Jenner reminds us that the decathlon takes "years of training and dedication." Unfortunately, this disc is too dull to inspire that kind of devotion.
—*Steve Bennett*

Bruce Jenner's World Class Decathlon

$39.95 list; Interactive Magic; 800/789-1534.
Grade: **C+**

READER SERVICE NO. 750

DOOM DOES ROLE PLAYING

AFTER THE RELEASE of such revolutionary 3-D games as Duke Nukem and Quake, you'd guess that Doom-style titles were dead. Well, you'd be wrong. With **Strife**, Velocity puts new tang into an old soup by adding role-playing ingredients to Doom's first-person slayathon recipe.

Strife's 3-D world melds medieval environments with twentieth-century technology. You play a rebel seeking to overthrow a dictatorship that wants to keep the world mired in endless strife. You must travel through 30 levels, interact with the characters you meet, and conduct secret missions that abet the underground rebellion.

The game does a good job of distinguishing itself from Doom. First, it uses an enhanced version of Id Software's engine, which adds the ability to jump, plus some graphical interludes that propel the adventure. A big difference is the game's role-playing aspect. Instead of just blowing away everyone you see, you talk with people to gain valuable information.

PC WORLD

TOP 5 SOUND BOARDS

		Month tested	Street price	Overall rating	Audio score	Comments	Reader service number
1	Creative Labs Sound Blaster AWE32 PnP 800/998-5227 www.creativelabs.com	June 96	$250	92	92	**FEATURES:** Plug and Play, 512K of RAM expandable to 28MB for downloadable MIDI sounds, DSP for MIDI effects, Sound Font editing software. **PROS/CONS:** Top-quality wavetable sound, flexible MIDI composition software, trouble-free installation, good frequency response; noisy microphone.	721
2	CrystaLake Model 110 503/222-2603 www.crystalake.com	Aug 96	$169	92	87	**FEATURES:** Plug and Play, 3-D sound with adjustable center, fill, and effect depth, stereo microphone input. **PROS/CONS:** High-quality wavetable MIDI sound, realistic 3-D sound effects, good frequency response, inexpensive, three-year warranty; poor cross-talk figures, no reverb or chorus.	722
3	Creative Labs Sound Blaster 32 800/998-5227 www.creativelabs.com	June 96	$149	92	90	**FEATURES:** $20 price drop, Plug and Play, OK of RAM expandable to 28M8 for downloadable MIDI sounds. **PROS/CONS:** Top-quality wavetable sound, good frequency response, inexpensive, trouble-free installation; poor frequency response on microphone input.	723
4	CrystaLake Model 140 503/222-2603 www.crystalake.com	June 96	$269	90	87	**FEATURES:** Plug and Play, 3-D sound with adjustable center, fill, and effect depth, reverb and chorus, stereo microphone input. **PROS/CONS:** High-quality wavetable MIDI sound, realistic 3-D sound effects, low noise, good frequency response, three-year warranty; poor cross-talk figures.	724
5	Advanced Gravis UltraSound Plug & Play Pro 800/663-8558 www.gravis.com	May 96	$199	89	85	**FEATURES:** Plug and Play, 512K of RAM upgradable to 8MB. **PROS/CONS:** Excellent audio performance, good microphone input, professional-grade wave editing and MIDI software, affordable, easy installation; mediocre MIDI sound, awkward procedures for switching game and MIDI modes in DOS.	725

Best Buy

TESTED THIS MONTH: AN UNBEATABLE PRICE AND OUTSTANDING MIDI WAVETABLE sound performance distinguish Shark Multimedia's Mako Plus 32, a newcomer this month to the *PC World* sound board field. Priced at just $65 on the street, the Mako Plus's budget appeal was nearly strong enough to lift it onto our Top 5 chart for October. Unfortunately, the Mako Plus board faltered on the test bench, with relatively poor results in our frequency response, cross-talk, distortion, and noise tests. The built-in QSound 3-D effect added excessive hiss as well as an unpleasant hollow quality to the sound. On the other hand, clear documentation and Plug and Play compatibility made installing the Mako Plus a breeze.

HOW WE TEST All boards are tested on an Audio System Precision 2 workstation to determine their frequency response, cross talk, noise, distortion, and other audio characteristics. We judge each board's MIDI and wave audio quality by comparing sample sounds against original source material on DAT. The overall rating is based on the following weighting of factors: performance (40 percent), features (25 percent), price (25 percent), and support (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. FOR MORE INFORMATION ABOUT ALL PRODUCTS IN THIS TABLE, CIRCLE READER SERVICE NO. 909.

FAREWELL, MY HOVEL: Bad things happen between meaningful conversations in Strife.

Compared to such recent offerings as Zork Nemesis and Secrets of the Luxor, Strife's graphics are mediocre. But the game's strong story, high-quality voice acting, and superbly drawn scenes put a fresh twist on an otherwise Doomed idea. —*Shane Mooney*

Strife

$49.95 list; Velocity; 415/776-8000. Grade: **B**

READER SERVICE NO. 751

STRATEGY FOR THE THINKING GAMER

MISSION FORCE: CYBERSTORM, the latest game from Sierra, takes the hex-based strategy genre to a new level of complexity and delivers hours of intense play.

The vivid graphics in **Mission Force: CyberStorm** immerse you in a futuristic world where the task of outfitting your fleet demands time and careful planning. You start as an ensign in the Unitech army and make combat preparations by purchasing Hercs—walking weapons of mass destruction à la MechWarrior. Then you create synthetic life forms called Bioderms, which will pilot the Hercs and fight your battles. When your fleet is ready, you select a military operation and get ready for war.

Your mission: Destroy the evil Cybrid threat while mining ore on each planet. The ore helps you repair damaged machines and expand the fleet. Be careful: It's easy to spend all your credits on Hercs; you must make special efforts to balance firepower with thrift.

Avid strategists will drool over the 3-D texture-mapped graphics and the excellent multilevel terrain maps. But if you crave the instant rush of action Descent or Doom supplies, you may be disappointed when you reach CyberStorm's battle zone. The heat in this thinking person's game doesn't arrive for many turns.

Sierra includes two discs in each package. When you tire of playing by yourself, the bundled "buddy" disc allows networked or modem play.

If you can master careful investment in technology, proper mission planning, and savvy field strategy, you'll claim endless victories at the outer reaches of the galaxy. —*Matt Sanner*

Mission Force: CyberStorm

$54.95 list; Sierra; 800/757-7707. Grade: **B+**

READER SERVICE NO. 752

IS THERE URBAN PLANNING AFTER DEATH?

IF LUCASARTS' engrossing **Afterlife** is to be believed, the hereafter holds both good news and bad news in store. The good news: Deceased souls get to decide their own fates. The bad news: The Demiurge—you—in charge of planning and administering the whole shebang has a limited bankroll and no on-the-job experience.

LucasArts insists that the game focuses not on Earth but on the planet of the Ethically Mature Biological Organisms, or EMBOs. Nonetheless, EMBOs—who look like E.T. on a weight-training program—display remarkably humanlike virtues and vices, and their cities have names like Madrid and Brownsville. Go figure.

Arriving souls, worth a mere dime apiece at first, are your only source of income, and everything from road maintenance to demon and angel employment costs money. To stave off destitution (and utter demolition of your franchise by the Four Surfers of the Apocalypso), you have to turn a profit. This feat is initially impossible, but eventually both the number and the per capita value of souls rise, giving you a shot at solvency. Efficient resource allocation is the key to everlasting profit.

But to complicate matters, your spectral realms are subject to a number of catastrophic events: unseasonable chill in hell and mighty clouds of joylessness in heaven; redistribution of buildings from one afterlife to the other; messy bats and bluebirds; and some property-bashing heavy hitters—Vinnie the Disco Demon and the Paradise Pair of Dice.

Afterlife's creators pillaged SimCity for much of the game play, but they added micromanagement controls and mystical energies for enhanced complexity. You also get two busybody consultants à la Civilization II: a ditzy blonde angel and an unctuously insincere demon.

FIENDISH PLAN VIEW: Elaborate torments await the conscientious soul in Afterlife.

With outstanding graphics and excellent music, Afterlife provides endless hours of entertainment, if you have world enough and time. —*Steven Gray*

Afterlife

$49.95 list; LucasArts; 800/985-8227. Grade: **A-**

READER SERVICE NO. 753

EDUCATION

GUERRILLA MARKETEERS IN THE MIDST

SO YOU HAVE ONLY $50 to market your start-up company? You'd do well to spend part of it on **Jay Conrad Levinson's Guerrilla Marketing**, an interactive version of the best-selling book of the same name.

Guerrilla Marketing has become a classic guide to marketing and advertising on

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Circle 88 on reader service card

THE CHÉ OF SELLING: Guerrilla Marketing helps you plot your niche assault. Examples show how to use TV advertising effectively.

the cheap. The CD-ROM goes the book one better, using multimedia technology to describe tactics that let even small and medium-size companies seize big-league marketing opportunities. Enter some details about your marketing budget and goals, your available time, and other key factors, and the disc will recommend print, video, online, and audio vehicles that give you the biggest marketing bang for your buck.

Real-world examples help bring the title to life, especially the collection of TV ads and follow-up analyses that demonstrate how to use television to maximum effect. The incisive tips will help you avoid costly mistakes.

A minor downside is the awkward interface. Bear in mind, too, that no guruware can substitute for sound strategic and tactical business decisions. Still, if you're looking for ways to maximize your marketing dollars, Guerilla Marketing is definitely worth the $40 investment.
—Steve Bennett

Jay Conrad Levinson's Guerrilla Marketing

$39.95 list; Houghton Mifflin Interactive; 800/829-7962. Grade: **B+**

READER SERVICE NO. 754

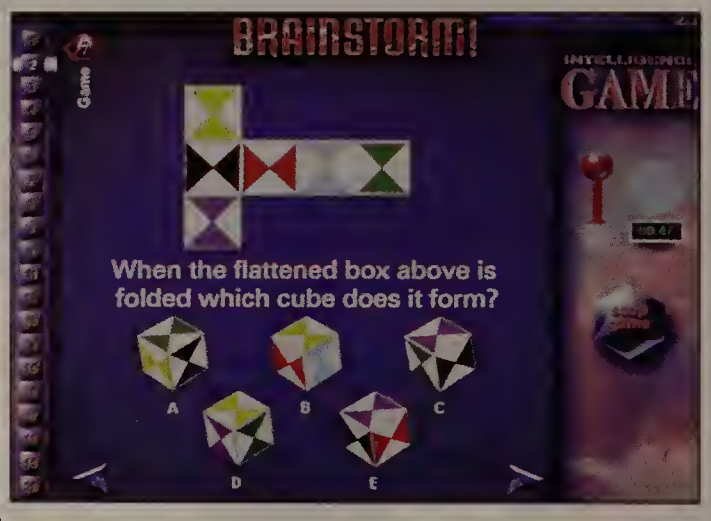
DUMBSTRUCK

MY WORST FEARS ABOUT my mental capacity are confirmed. After several hours working through problems in the fun and challenging **Brainstorm,** billed as "The Ultimate IQ Challenge," I'm surprised anyone lets me handle sharp objects.

The disc begins with a brief, shallow overview of the brain's physiology and concludes with a few tough brainteasers. In the middle is the real gray-matter workout: an Intelligence Game that presents 20 problems on each of seven levels.

Culture- and gender-neutral questions test your logical reasoning, your mastery of spatial relationships, and your grasp of abstract visuals. After selecting an answer, you can click the Solution button to hear an audio explanation and watch a 3-D animated demonstration of the correct answer. Sure beats filling in circles with a number 2 pencil.

After you warm up with the Intelligence Game, the pressure's on in the IQ Challenge. You have to beat a digital clock that counts down the time you allotted



ACHIEVE SELF-ENLIGHTENMENT in Brainstorm's mental workout. Puzzles, brainteasers, and riddles may humble you.

yourself—from 20 to 60 minutes. Since the Solution button is absent here, you have to choose an answer and move on to the next question without knowing whether your choice is correct.

The disc lacks an online component, so you can't check your performance against other players. Brainstorm could do much more to exploit multimedia, such as offering in-depth and animated information about the workings of the brain.

The audio and 3-D animation that the CD does use to demonstrate correct answers are effective teaching tools. But after seeing my scores, I don't think the Mensa people will be calling anytime soon.
—Kimberly Stein

Brainstorm

$34.95; Simon & Schuster Interactive; 800/910-0099. Grade: **B**

READER SERVICE NO. 755

THE DIGITAL YOU

TO DISCOVER THE REAL YOU, would you consult (a) a friend, (b) a relative, (c) an objective third person, or (d) your computer? If you answered d, then HarperCollins Interactive's **Who Do You Think You Are?** fits your personality to a T.

This disc lets you try the Berkeley Personality Profile test: You complete a single multiple-choice test 15 times from different points of view (your inner, outer, ideal, and worst-case selves). The program then uses your answers to generate a series of descriptive profiles about your fascinating multifaceted self.

The BPP's authors slam the astrology-like typecasting of rival tests (such as the Myers-Briggs Type Indicator and the Enneagram), in contrast to the BPP's "scientifically valid" multidimensional approach. Unfortunately, after tracking each of five personality dimensions (expressive, interpersonal, work, emotional, and intellectual), the BPP makes no effort to integrate those results. Instead, it generates five miniature personality profiles, based on seven questions each. I ran five iterations of the test for two very different hypothetical subjects and obtained identical profiles.

As a source of insight into your multidimensional personality, the Berkeley Personality Profile is about as deep as aluminum foil. You're better off with a Ouija board. *—Steven Gray*

Who Do You Think You Are?

$39.95 list; HarperCollins Interactive; 800/424-6234. Grade: **D+**

READER SERVICE NO. 756

DO YOU FEEL THAT YOU are someone who is easily entertained? Take the Berkeley Personality Profile test and find out.

The Quality You Need At The Price You Want.

Go With The Scanner From The Scanner Experts.

How To Choose the Best Scanner & The Best Scanner Maker.
In the market for a scanner? There's a lot of low-priced scanners available these days. But if you want a reliable desktop scanner, made by a company with the longest history of making desktop scanners and with a reputation for superb image quality year after year — *then make your scanner a Microtek!*

Introducing A Single-Pass Color Flatbed Scanner For Only $399!
Starting at just $399, the new *ScanMaker® E3* captures images at resolutions up to 2400 dpi in extremely life-like color. The ScanMaker E3 includes Microtek's easy-to-use *ScanWizard™* scanner controller software for Windows or Macintosh. ScanWizard lets you enhance, add special effects to images — *even before you scan them!*

The ScanMaker E3 also includes *Caere's OmniPage Limited Edition OCR software* for scanning pages of text, *Ulead's ImagePals 2 Go* and *PhotoImpact SE image editing software* for Windows, or *MicroFrontier's Color It! image-editing and paint software* for Macintosh.

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Need higher resolution? Ask for Microtek's *ScanMaker® E6* which *starts at just $599!* With its 30-bit depth and 4800 dpi maximum resolution the ScanMaker E6 renders images with increased detail in highlights and shadows. The ScanMaker E6 includes ScanWizard, OCR and image-editing software for Windows or Macintosh. And both the ScanMaker E3 and E6 work with Windows 95.

"◆◆◆◆"
MacWEEK (August 7, 1995)

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DynaSonix™ PRO with AEP™: *The Best...and Last...Sound Card You'll Ever Buy!*

DynaSonix™ PRO is a high performance wavetable synthesis card with an Audio Effects Processor (AEP) that provides a powerful Dual Channel 10-Band Graphic Equalizer and SRS™ 3-D surround sound. It incorporates 18 bit audio with 128 times over-sampling for superior sound quality. It also comes with full duplex Internet telephony (Webtalk™), and music software.

DynaSonix™ 3-D: *The Gamer's Choice!*

DynaSonix™ 3-D is a high performance wavetable synthesis card with SRS™ 3-D surround sound. It comes with full duplex Internet telephony (Webtalk™), games, and music software. Offers great sound at an affordable price!

DynaFx™: *The Ultimate Multimedia Authoring Solution!*

DynaFx™ is a Multimedia video authoring solution that combines a television and video capture card, along with Director's Chair™, an easy to use Multimedia authoring application. It comes complete with a software MPEG encoder and is VDOLive™ compatible. It is capable of digitizing, editing, and playing back video on your computer.

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V I D E O

Video Craves Hot Hardware

I RECENTLY UPGRADED from Windows 3.11 to Windows 95, partly because I thought video playback would improve. But it doesn't seem to have had any effect. Do I need to upgrade my video applications as well?

David Ount, Miami

THE FACTOR THAT MAKES the most difference in video playback performance isn't applications, but hardware.

Windows 95 includes enhancements (such as faster video memory updating and a CD File System) to improve playback of any application. But installing Windows 95 isn't the whole answer. Other likely performance bottlenecks include the amount of RAM you have, your CPU, your CD-ROM drive, and your video card.

High-quality full-motion video requires 30-frames-per-second performance, which translates into at least 16MB of system memory under Windows 95. CPU speed is also crucial to video playback.

If you're using a double-speed (or slower) CD-ROM drive, obtaining decent full-motion video is practically hopeless. The difference is made up by software compression and decompression (codec), but decompression is computationally intensive, and slow CPUs will huff and chug to try to achieve a smooth video picture.

CLICK MULTIMEDIA in the Control Panel to view the video codecs installed on your PC.

Finally, your graphics adapter might be slowing you down, especially if your system uses the older, slower ISA bus. To upgrade to the faster VESA Local Bus (VLB) or, even better, to the PCI bus, you'll need both a new video card and a new motherboard. You can get a top-flight PCI motherboard for about $200 and a good PCI graphics accelerator for between $100 and $300.

The hottest new codec, MPEG-1, has not yet been included in Windows 95 but is provided in many video cards. You can download free versions of the codec from the World Wide Web, but you'll need a fast CPU: MPEG-1 is very demanding.

Startup Programs and Games Can Coexist Peacefully

RECENTLY I HAD TROUBLE GETTING some downloaded games to run on my Windows 95 system. The culprit turned out to be a virus scanner I'd installed. Installation routines usually advise you first to close any open applications, and when I see such a message I close all the open windows on my desktop. But neither the virus scanner nor any of the other programs in my Startup folder had an open window, so it was easy to forget them.

If I'd remembered, I could have removed the offending program from my Startup folder before rebooting. But finding the Startup folder can be difficult, too: It's buried in the Windows\Start\Programs directory. And after installation I would have had to drag the icons I had removed back into the folder to reset them for automatic start-up.

HAVE A GAMES CONFLICT? Right-click icons in the Windows 95 tray to disable the Startup programs.

Fortunately, there is a much easier way to deal with the problem. When a startup application runs as a minimized program, Windows 95 places its icon at the right end of the Taskbar, in an area known informally as the tray. Right-clicking an icon brings up a menu, with a Disable (or Suspend) option when applicable. The icon for a disabled program changes to reflect its state. And since this is a toggled command, you can reactivate the program simply by repeating the process.

Mark Parker, Bellevue, Washington

A U D I O

UNKNOWN DRIVE

AFTER I BOUGHT Soundgarden's Enhanced CD, Alive in the Superunknown, I discovered that my double-speed CD-ROM drive isn't compatible with the title. Do you know of any listing that details which types of CD-ROM drives can play Enhanced CDs? Is there an applicable standard, such as MPC-3, that compatible CD-ROM players print on their boxes?

Rob Comy

75604.567@compuserve.com

IF THE BOX SAYS THAT the CD-ROM drive is MPC-3–compatible, don't worry. This standard calls for a 75-MHz or higher Pentium processor, 8MB of RAM, a 540MB hard drive, wavetable audio, and a quad-speed CD-ROM drive compatible with the CD-ROM XA and multisession PhotoCD specifications.

You're probably having trouble because your CD-ROM drive lacks support for multisession discs. CD-Plus, the format used by most Enhanced CDs, stores the music and the computer data in different "sessions" of the disc. The music resides on tracks 1 to 99 (this is considered the first session), where audio-only players can recognize it, and computer data is stored on higher tracks as the second session. If your CD-ROM drive doesn't support multisession discs, it won't recognize data stored in the second session.

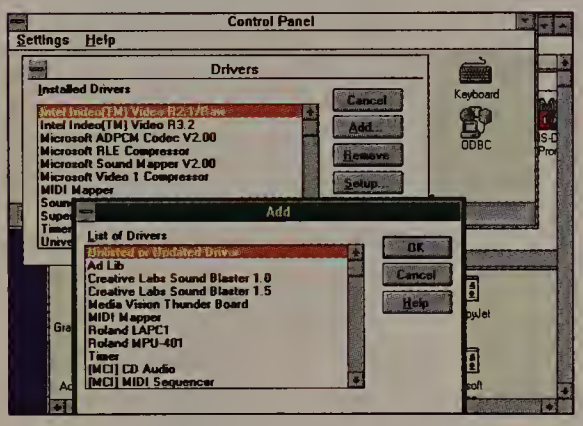
Until recently, despite supporting multisessions, some CD-ROM drives from NEC and Toshiba contained firmware incompatible with Enhanced CDs. All NEC CD-ROM drives currently available are Enhanced CD–compatible. Toshiba reports that its SCSI CD-ROM drives are all compatible but many of its Enhanced IDE CD-ROM drives aren't. If you have questions, you can reach NEC at 800/632-4667 and Toshiba at 714/455-0407.

STOP THAT SCREECH

I HAVE A GENERIC 486DX-33 with a 500MB hard drive, Windows 3.11, and a Sound Blaster Pro sound card. When I exit Windows I hear a loud screech that drives me crazy. The only way I've found to stop the sound is to reboot or load another software package that has its own sound drivers. How do I get rid of this awful noise?

Chet Armellino
armellino@llnl.gov

FROM YOUR DESCRIPTION, it sounds as though you're using the Ad Lib sound driver under Windows. Users have found that operating that driver with the Sound Blaster Pro sometimes produces exactly the result you're getting.



THE FIRST RULE OF TROUBLESHOOTING sound problems is to make sure you have the correct—and most recent—drivers loaded.

To confirm that this is the problem, launch Control Panel and select Drivers to see which ones are currently loaded. If the Ad Lib driver appears in the list, remove it by highlighting the driver and clicking the Remove button; then load the Sound Blaster driver by clicking the Add button and following the directions to tell Windows where the appropriate driver is located. Or you can obtain the most recent Sound Blaster drivers from the Creative Labs Web site at http://www.creativelabs.com. The specific files you'll want to download depend on the version of the driver software you already have. Consult the Drivers and Patches section of the Web site for details.

GENERAL

PHOTO-PAINT VS. PHOTOSHOP

I USE COREL PHOTO-PAINT, and I'd like to know how this program and Adobe Photoshop differ. I don't edit images for a living, but someday I may want to. I've heard that Photoshop is the preferred professional tool. Why is that?

Douglas W. Dangler
Danglers@prodigy.com

FOR MOST CASUAL USERS who want to edit images, Photo-Paint offers an easy-to-use and (at $289) affordable package. The program even includes functions once available only in high-end products, such as the ability to work on multiple layers, print color separations (the cyan, magenta, yellow, and black images that combine to make a full-color print), and "trap" colors (that is, overlap colors to prevent gaps). Photo-Paint also includes a generous supply of 2-D and 3-D filter effects.

If you plan to edit images for a living, though, you'll want to switch to Photoshop, despite its $895 price tag. The differences seem subtle, but they're crucial.

At first scan, Photo-Paint's tools may appear equal to Photoshop's, but when you look a little closer, you'll find that fewer of Photo-Paint's tools support antialiasing, a process of removing jagged edges from lines. Photo-Paint also lacks Photoshop's finer hands-on controls over four-color printing.

Photoshop offers unparalleled support from third-party vendors and consultants. As a result, more add-on tools and utilities are available for Photoshop.

Finally, Photoshop takes advantage of multiple processors in a system, which greatly speeds operations—especially if you're dealing with large images. Of course, you must have a multiprocessor system—ideally with Pentium Pro chips—to take advantage of this; you'll also want to run on Windows NT. Yes, that's an expensive proposition, but if you're making money working with large, high-resolution images, it's well worth considering.

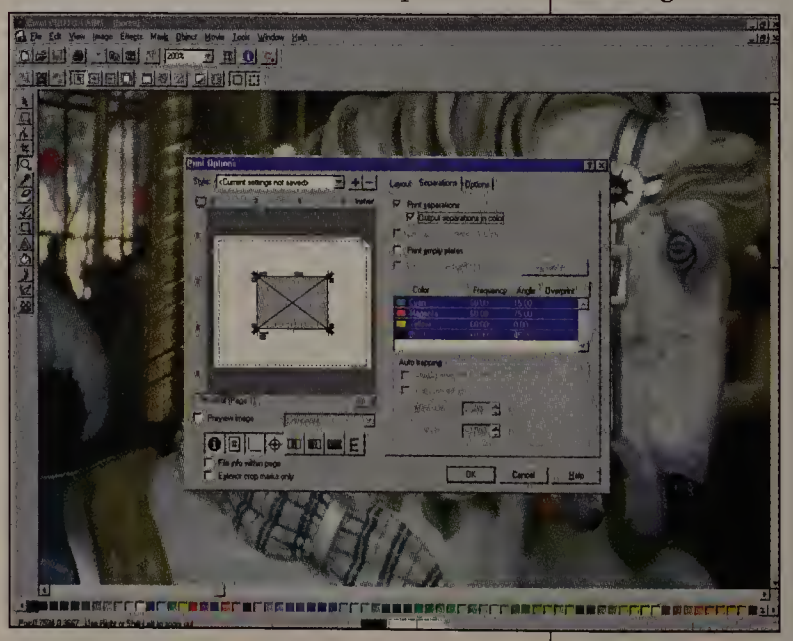


PHOTO-PAINT OFFERS good control over color separations, but it can't match Photoshop's range of professional tools.

SCREEN SAVER AUTEUR

HOW CAN I MAKE my own screen savers? Is there a suitable software package? Do I need a video editor or an animation package?

Jeff Hier
drizzt19@pop.idt.mainstream.com

ONE PRODUCT THAT claims to do what you ask is MacSourcery's CineMac series, which creates modules for most screen-saver engines from files created in Macromedia Director. These screen savers can employ any media you use in your authoring system, including photos, digital artwork, video, and animation.

The software, aimed primarily at developers, is available for Windows and starts at $299, not including the cost of Director. This price covers limited royalty-free distribution of screen savers; an unlimited distribution license goes for $999. You can reach MacSourcery at 800/622-7723.

If you are less ambitious, you might consider sending your photos to a company that will scan them and produce screen-saver modules for you. These services charge about $20 for four photos. Animations cost extra.

To locate custom screen-saver services, try searching the Web for screen saver. Among the two dozen sites you'll find, Idaho Interactive (http://idibbs.com), White Oak Interactive (http://www.whiteoak.com), and Digital Design Studio (http://www.windworks.com) provide particularly well-designed interfaces.

Some screen-saver companies (including Berkeley Systems, makers of the very popular AfterDark screen saver) have departments that are equipped to produce custom screen savers. You can reach Berkeley Systems at 510/540-5535.■

TECHNOLOGY UPDATE

Fifteen years of microelectronic research makes conventional antennas a thing of the past!

This little box uses your home's electrical wiring to give non-subscribers, cable subscribers and satellite users better TV reception on your local broadcast networks!

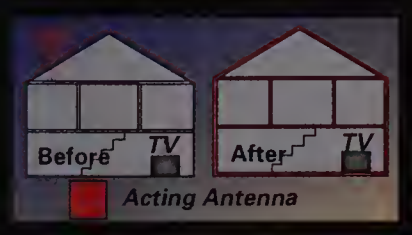
by David Evans

Technology corner

1. Why don't conventional antennas work as well as the Spectrum?

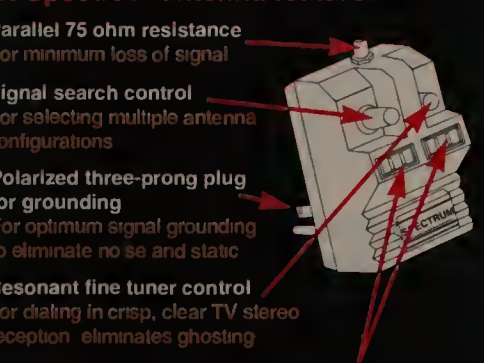
- When TV signals are tuned at the TV channel's center frequency, optimum tuning has been achieved.
- Other antennas can't offer center frequency tuning like the Spectrum Antenna can. They only offer such tuning up to the edge of the center frequency. As a result your TV picture remains snowy.

2. How does Spectrum use a home's electrical wiring as an antenna?



Believe it or not, the Spectrum Antenna simply "activates" the giant antenna that already exists in your home. Essentially, it uses all of the wiring throughout your home's walls and ceilings to make an antenna as large as your house for unbelievably clear reception of local broadcasting.

3. Spectrum antenna features



Until recently, the only convenient way to guarantee great TV reception was to have cable installed or place an antenna on top of your TV. But who wants to pay a monthly cable fee just to get clear reception, or have rabbit-ear antennas that just don't work on all stations? Some people just aren't interested in subscribing to cable. Or they may live in an area where they can't get cable and TV-top antennas aren't powerful enough. And what about those people who have cable or satellite systems but still can't get certain local stations in clearly?

Now, thanks to fifteen years of microelectronics research, a new device has been developed that is so advanced, it actually makes conventional antennas a thing of the past. It's called the Spectrum Universal Antenna/Tuner.

Advanced technology. Just imagine watching TV and seeing a picture so clear that you'd almost swear you were there live. Just plug the Spectrum Antenna into a standard AC outlet and plug your TV into the Spectrum. You can remove the unsightly clutter of traditional TV-top devices gathering more dust than television signals. Get ready for great reception. Your TV will suddenly display a sharp, focused picture thanks to its advanced design "Signal Search" and "Fine Tuner" controls.

Uses your home's electrical wiring. The Spectrum Antenna is a highly sophisticated electronic device that connects into a standard wall outlet. The outlet interfaces the Spectrum Antenna with the huge antenna that is your home wiring network. It takes the electrical wiring in your house or apartment and turns it into a multi-tunable, giant TV reception station which will improve your TV's overall tuning capability. The results are incredible. Just think how much power runs through your home's AC wiring system—all that power will be used to receive your local broadcasting signals.

How it works. Broadcast TV signals are sent out from the local broadcast station (ABC, CBS, NBC, etc.). They interface with your home's AC power line system, a huge aerial antenna network of wiring as large as your home itself. When the Spectrum Antenna interfaces with the AC line, the signal is sent to its signal processing circuit. It then processes and separates the signal into 12 of the best antenna configurations. These specially processed signals route themselves into 12 separate circuits. The Spectrum Antenna includes a 12-position rotary tapping switch, the "Signal Switch" control, which gathers twelve of the best antenna configurations.

The "Signal Search" offers varying antenna configurations for the user to select from the best signals of all those being sent. The signal then passes through the Spectrum Antenna's special "Fine Tuner" circuit for producing crisp, clear reception.

Risk-free offer. The Spectrum Universal Antenna/Tuner comes with our exclusive 90-day risk-free home trial and a 90-day manufacturer's warranty. Try it, and if you're not satisfied, return it for a full "No Questions Asked" refund.

Who can use Spectrum?

- ***Cable users-You have cable but you can't get certain local stations in clearly.***
- ***Non-cable users-You don't have cable and want the stations to come in more clearly***
- ***Satellite users-You have a digital satellite system but can't get local stations in clearly***

Limited time offer! We realize that most people have more than one TV in their home. We are offering a special discount on additional Spectrum Antennas so you get great reception on all your TVs!

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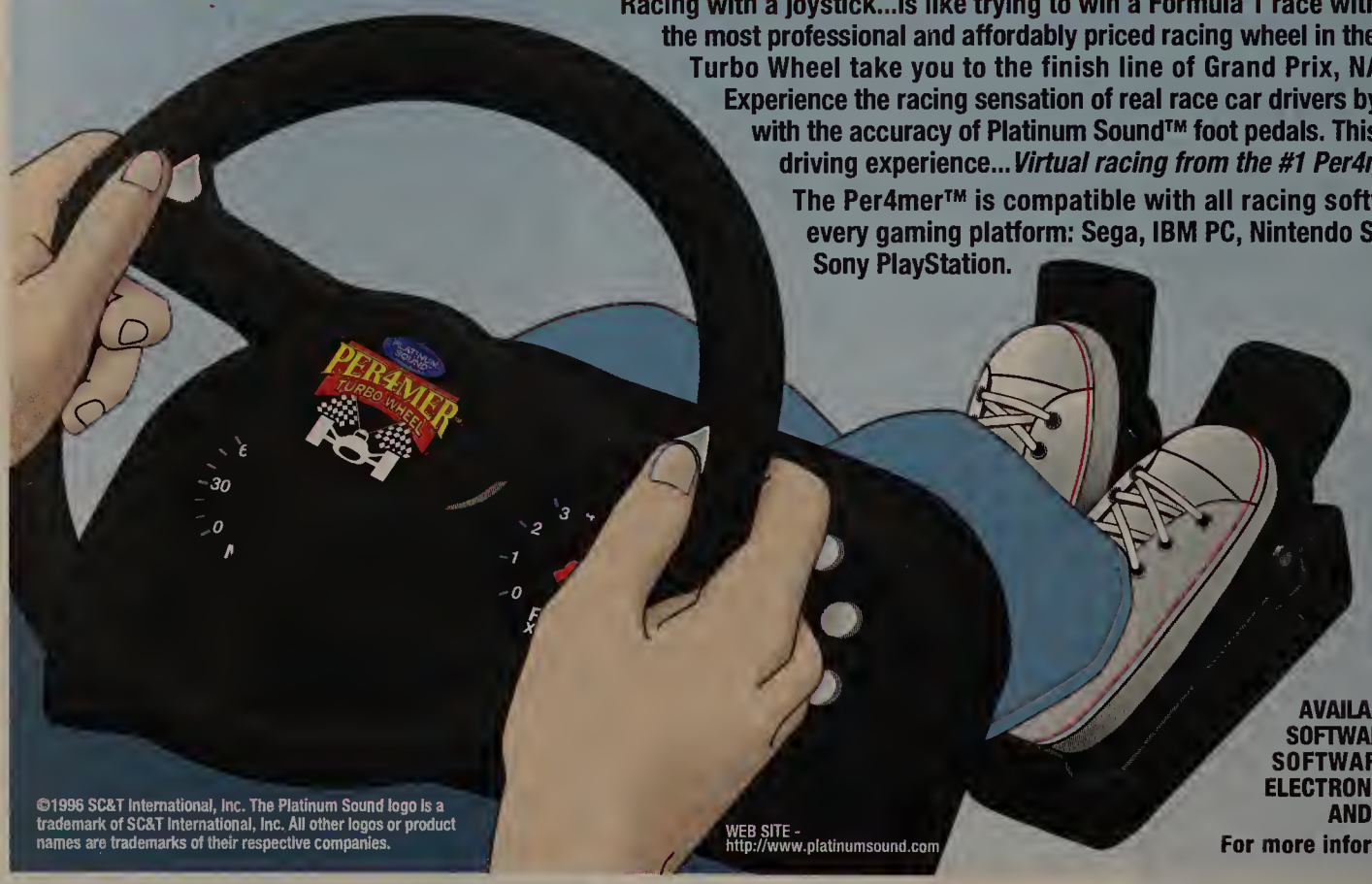

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R.S. No.	Product	Page number
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Circle 228 on reader service card

HERE'S HOW

REAL PROBLEM, REAL SOLUTION

How can we safeguard our company's critical database? —*Christopher Giglio*

SOUTHERN CALIFORNIA EDISON'S CHRISTOPHER GIGLIO fixed an error-ridden database.

WHEN IT COMES to making changes to a crucial database, you can't be too careful. As typos and other human errors accumulate over time, data becomes unreliable, and that can cause real difficulties for your company. This month, Christopher Giglio, a database administrator with Southern California Edison Company, explains how his company recovered from input errors that were creeping in, and what it's doing now to prevent them. —*Editor*

PROBLEM: WHEN GOOD DATABASES GO BAD

PEOPLE ARE OFTEN the biggest problem with databases. By entering typos, omitting fields, or accidentally deleting records, employees can wreak all kinds of havoc with a company's most critical information.

I work at a power plant that belongs to Southern California Edison, the second-largest utility in the United States. Needless to say, the people who work here are incredibly careful when it comes to inspecting the facility.

But we found out the hard way why it's so important to keep our inspection database clean and error-free: When errors cropped up in this database, field inspectors put in a great deal of extra work to make sure that everything had been inspected properly—a significant increase in operating costs.

Back in 1987, a computer expert here built a dBASE database that tracked the inspection of the thousands of metal welds that seal the plant's water and steam pipes.

The database held information about the type of weld, the amount of pressure on the pipes, the date of the last inspection, the dates that future inspections were expected, and so forth. The database was stored on a single 386 PC, and only one person—the administrator—could change the information in it.

Over the course of eight years, the administrator—a very bright person but as fallible at data entry as the rest of us—introduced typos and other errors into the system that went uncorrected.

For example, he would sometimes enter a value as 1 instead of as 1.00. As a result, a user searching the database for all equipment with a value of 1.00 wouldn't see the total number of entries.

Another common error was empty fields. If the data administrator didn't know an inspection date when entering a record, he would skip that field, planning to fill it in later—but he didn't always get around to it.

Finally, if he deleted something by accident, there was no easy way to retrieve it; instead, he'd have to pull the data from the most recent backup.

Because care was taken to back up data, there was no real problem with lost information; the problem was that inspectors in the field were sometimes given inconsistent information in their paper printouts of the database.

If a field inspector was told to look at 10 welds in a given area and found 11 welds, the discrepancy would cause the inspector to inspect all 11 welds, even if they had recently been checked, just to be on the safe side. Since scaffolding often had to be erected to get look at even a single weld, the inspectors lost quite a lot of time rechecking their work.

PHOTOGRAPH: AMY ETRA

SOLUTION: TAKE OUT THE GARBAGE

IN 1994, MANAGEMENT noticed the problem. The database administrator left the company, and I was hired to take over.

The first task was to clean up the database—a process that took several months because of the thousands upon thousands of entries.

Fortunately, the computer made it easy to cross-check all the records and find discrepancies. It was a quite simple matter of searching for an inconsistency (say, "1," as in the earlier example) and replacing it with the correct entry (say, "1.00").

'Employees can wreak all kinds of havoc with a company's most critical information.'

Next, we took all the eggs out of our single basket by assigning five people to manage the database. Members of the team could check each other's work and avoid a knowledge drain should one of them leave.

To make this new team management approach possible, we also moved the database to a network server. This meant that backup was automatic and that others in the plant—such as the people who schedule inspections—could get read-only access to the data.

We also put in several safeguards to keep the data secure and clean.

The first task in this process was to add safeguards in data entry. We did this by setting up a "validation table" that automatically prescreens the data for certain errors before it's committed to the database.

For example, an inspection date must fall within a particular time range. If the date you enter falls within that range, the system lets you move to the next field; if it doesn't, the system prompts you to reenter the date until it's valid.

We also set up a way to trace data entries. Before, there was no way to tell what kinds of changes had been made to the database; you could see the date that a change had been made, but not what had been changed. We fixed this with an effective, behind-the-scenes audit trail that shows what kind of change was made, who the user was, and the date and time of the change.

Finally, to make sure we never threw anything away, we set up a history file that automatically tracks all records no matter what happens to them.

When a user enters a updated record, the original record is copied to another file. And if a record is deleted, it's actually moved to the history file. That way, we always know exactly what changes have been made to the database.

Now, the folks in the field who inspect the welds are very confident that the information they're receiving is correct, so they don't have to waste time reinspecting welds that were already checked.

Edited by Bronwyn Fryer ■

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

GARBAGE PREVENTION

Here are five steps you can take to prevent errors from creeping into your company's most important databases.

- Don't put one person in charge of the database. Commit the database to a team whose job it is to maintain and check the data and see that it's backed up regularly.
- If possible, store the database on a network server, where it's easier to automate backup and oversee and distribute the data to those who need it.
- Include validity checks to ensure that data is entered correctly.
- Make data entries traceable, so you can see what kind of changes are made, the name of the person who made the alteration, and the date and time of the entry.
- Never throw away any of your records. Create a history file so that any record that is being changed or deleted is automatically copied to a history database.

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Are memory managers necessary? ◆ Save Exchange mail ◆ Boot to DOS again

MANAGE WINDOWS 95 MEMORY—BUT ONLY IF YOU MUST

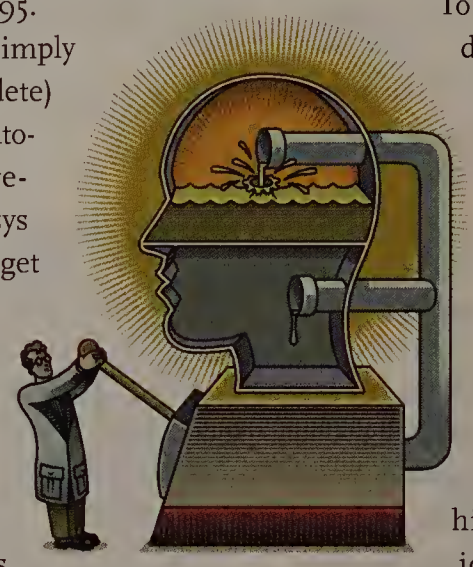
I'M PUZZLED BY your response to Peter Heasley in "Modifying Windows 95 to Run DOS Games" [*Help Line*, February]. You state that Windows 95 automatically loads common config.sys drivers such as emm386.exe, but later you suggest loading emm386.exe in config.sys to increase available DOS memory for games when running games in DOS mode.

David Kohfield, Anchorage, Alaska

DUH! MY BRAIN MUST HAVE been on a coffee break when I wrote that Windows 95 loads emm386.exe automatically. It does load himem.sys and other standard config.sys settings necessary for running the graphical interface, but it doesn't load the emm386.exe memory manager.

But managing your memory with emm386.exe is still sound advice in many situations, and in my opinion buying a third-party memory manager to use with Windows 95 is folly. In fact, if Windows 95 provides 32-bit drivers for most or all of your hardware, you probably don't need to bother managing memory at all.

If all your DOS programs already run without a hitch, managing your memory won't speed anything up or make your computer more efficient. Further, you'll find that memory managers have little or no effect in Windows 95.



Don't believe me? Simply rename (but don't delete) your config.sys and autoexec.bat files, and reboot. With no config.sys or autoexec.bat file, I get 611K of conventional memory free when I boot both of my home systems to the command prompt, and 605K in a DOS window in Windows 95—plenty of memory for just about any DOS program. Without going to any additional trouble, I can run the DOS games Descent, Doom, Full Throttle, and TuneLand, and get full use of the mouse and CD-ROM drive thanks to Windows 95's 32-bit drivers (the games provide their own sound drivers). And as long as I run them in full-screen mode, performance is just as good as it is in DOS.

If you're using disk compression, you may find less free conventional memory when you reboot without config.sys and autoexec.bat. If Windows 95 doesn't support all your hardware with a 32-bit driver, you'll also find that the unsupported hardware no longer works. Not to worry: Restore your renamed config.sys and autoexec.bat files, and begin your config.sys file with the following commands:

```
device=c:\windows\himem.sys
device=c:\windows\emm386.exe  noems
dos=high,  umb
```

If Windows 95 is installed in a different drive or directory, change the path in each device= statement as appropriate.

To load your existing 16-bit drivers and programs into upper memory (and out of conventional memory), use the **devicehigh=** statement instead of device= in config.sys, and in your autoexec.bat enter the **loadhigh** command before each program you want to load into upper memory. The devicehigh= and loadhigh statements do a great job of pushing Windows 95's DOS out of conventional memory as well. When I created a config.sys file with just these lines, my free memory jumped from 611K to 625K at the command prompt, and from 605K to 613K in a DOS session, with plenty of upper memory room to spare for loading drivers and TSRs.

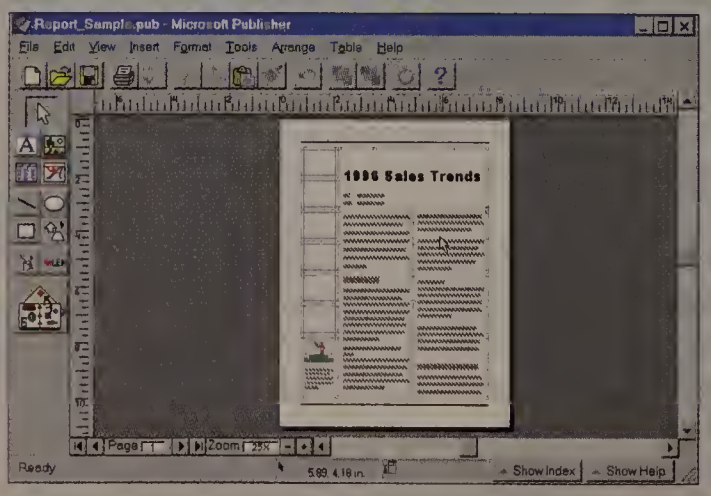
RETRIEVE MESSAGE COPIES WITH EXCHANGE

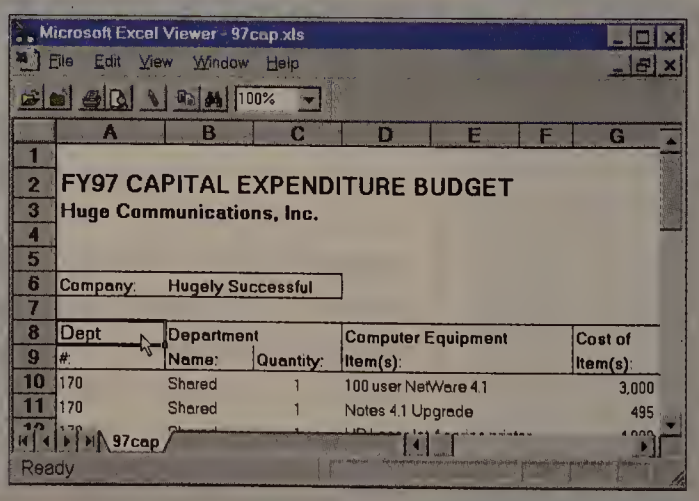
I USE A COMPUTER at home and one at my office. Occasionally I need to read new Internet mail at the office using Microsoft Exchange, then download and store the same mail at home using a different program. Trouble is, once I've downloaded the mail, Exchange deletes it from my Internet server mailbox.

I also need to be able to access my e-mail without losing it when I'm on the road. I want to stay current using the portable PC (on which I also use Exchange), and still be able to maintain a copy of all correspondence received on the office computer. ▶

Free Software From...Microsoft?

WHETHER YOU LOVE or loathe the World Wide Web, it's an absolute mother lode of free software tools and accessories. And whether you love or loathe Microsoft, check out the giant's home page (http://www.microsoft.com) for an ever-changing smorgasbord of goodies. Here on the left, for example, is a Microsoft Publisher template for formal business reports, courtesy of desktop publishing expert Roger C. Parker. On the right is the Excel for Windows 95 Viewer, an excellent way to deliver worksheets to anyone who doesn't need to edit the sheet.





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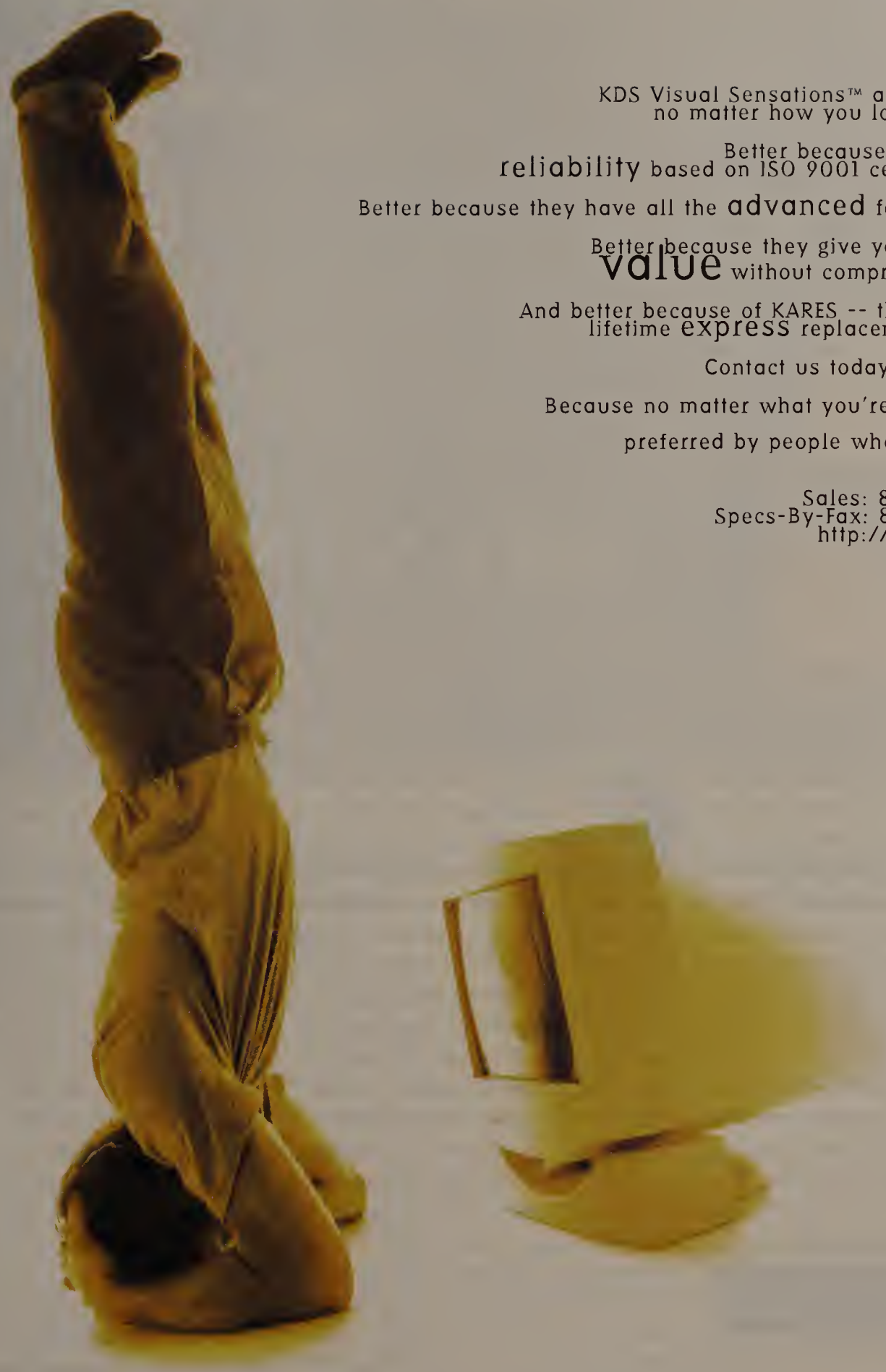

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Is there a way to read my mail with Microsoft Exchange but leave a copy on the server so I can read it again?

Michael A. Cuttler, Sarasota, Florida

EXCHANGE OFFERS NO global setting that leaves e-mail on the server, but you can use its Remote Mail utility to preview incoming messages and retrieve copies. The trick is to choose *Tools•Remote Mail•Internet Mail*, and then *Tools•Connect and Update Headers* (or click the icon). Once Remote Mail has downloaded the headers, which show the author and subject of the pending message, right-click each message you want to read, then choose *Mark to Retrieve a Copy* from the resulting menu (or highlight each message, and then click the icon). When you're done, choose *Tools•Connect and Transfer Mail* (see **FIGURE 1**), or click the icon. Exchange will download your messages without deleting the originals from your Internet server mailbox.

MAKE MY PC BOOT TO DOS AGAIN

I RECENTLY REMOVED OS/2 from my computer, but I guess I didn't do it properly. I used DOS's fdisk utility to delete the OS/2 partition and then create a new DOS partition. Now when I boot my computer, I get the error message 'Couldn't find OS/2. Press any key to continue', then the OS/2 dual-boot screen, with DOS as the only option. How do I get rid of this dual-boot option and boot straight to DOS?

Marcio Cohen, Rio de Janeiro, Brazil

AS YOU HAVE DISCOVERED, simply removing an operating system's partition or directories isn't enough. When you installed OS/2, it added its own bootstrap program to the hard disk's master boot record. Whenever you start your PC, its BIOS looks at the master boot record and hands control of the system to whatever program resides there—in your case, the OS/2 bootstrap program. That program in turn loads the OS/2 Boot Manager program, which correctly detected only one operating system on your hard disk.

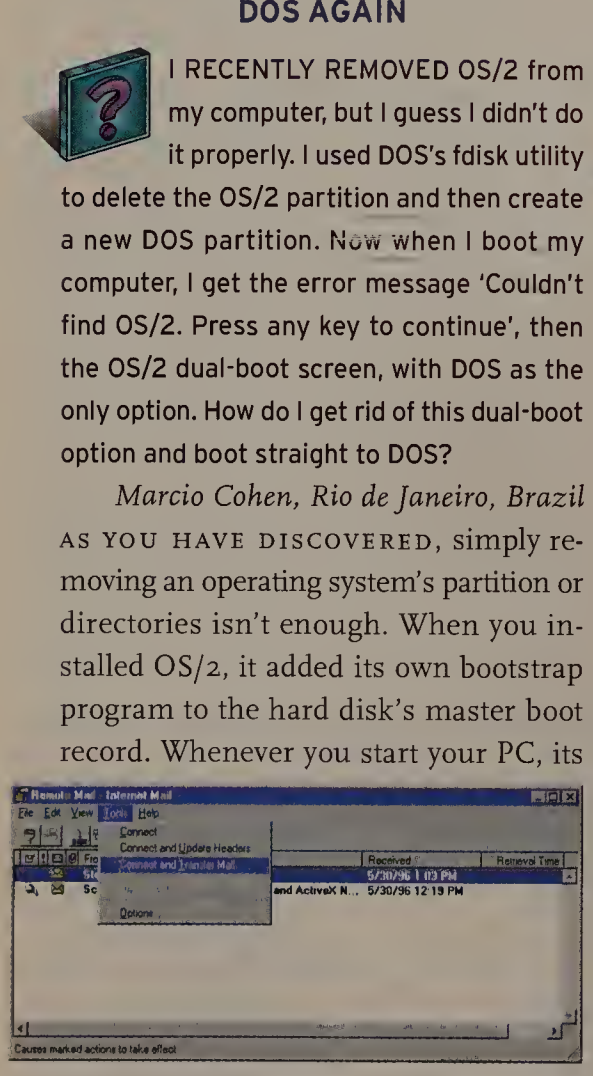

FIGURE 1: READ EXCHANGE MAIL, then read it again using Remote Mail's copy retrieval feature. Messages you select for transfer will be marked.

To replace OS/2's bootstrap program with DOS's (or with Windows 95's), boot to DOS or to the Windows 95 DOS prompt using a bootable floppy that contains the correct version of the sys.com program for your operating system, then enter the command **sys c:**. This writes the DOS or Windows 95 bootstrap program to the master boot record and copies the files io.sys (hidden), msdos.sys (hidden), and command.com to drive C:'s root directory. The next time you reboot, everything should work fine.

CAN PARTITIONMAGIC PREVENT CLUSTER'S LAST STAND?

I'D LIKE TO USE PowerQuest's PartitionMagic to repartition a large hard disk into several smaller drives so I get smaller, more efficient clusters. Specifically, I plan to split a 1GB drive into four 250MB partitions, which should save several megabytes of wasted space by reducing cluster size from 16K to 4K. Isn't it true, though, that while the new drives D:, E:, and F: will have 4K clusters, the original C: drive will still have 16K clusters? If so, am I better off just repartitioning with fdisk?

Henry A. Wentland, Orleans, Massachusetts

THAT WAS TRUE of PartitionMagic 1.0, but version 2.0 uses the optimal File Allocation Table cluster size for each partition. It also saves you the hassle of backing up your hard disk, then restoring it, which fdisk makes you do. That's the beauty of PartitionMagic: It lets you resize partitions without wiping out the data they contain.

If you use Windows 95, make sure you get the version 2.03 patch that fixes a potentially dangerous bug in Windows 95's fdisk utility; you can download it from PowerQuest's Web site (http://www.powerquest.com). For more on the problem, see August's *Bug Watch*.

• PartitionMagic 2.0 for DOS and Windows $49.95, OS/2 version $69.95; PowerQuest; 800/379-2566, 801/226-8977, 801/226-8941

READER SERVICE NO. 781

FIGURE 2: TO LINK DOS AND WIN 95 PCs, add network adapters and cables, then run Workgroup Add-On for MS-DOS 3.11 on the DOS PC.

NETWORK DOS AND WINDOWS PCs

I'M GETTING A Pentium system that will be running Windows 95. I'd like to connect it, via ethernet, to my current computer—a 286 running DOS 6.22. I'd like to share both PCs' hard disks so each can access the other's. What's needed on the DOS end to do this?

Charlie Ross, Medway, Massachusetts

ASSUMING THAT YOU'VE installed the ethernet adapters and cabling, all you need is the DOS-based peer-to-peer network software that will link up with Windows 95's built-in networking. The obvious candidate is Microsoft's Workgroup Add-On for MS-DOS 3.11 (see **FIGURE 2**). The product's only problems are its steep list price ($54.95) and lack of availability. You may have to call several mail-order or retail suppliers to find it. ■

• Workgroup Add-On for MS-DOS 3.11 $54.95; Microsoft Corp.; 800/426-9400

READER SERVICE NO. 782

Find additional tips at http://www.pcworld.com/hereshow.html. Answer Line *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Spanbauer is the author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240).* *See page 14 for contact information.*

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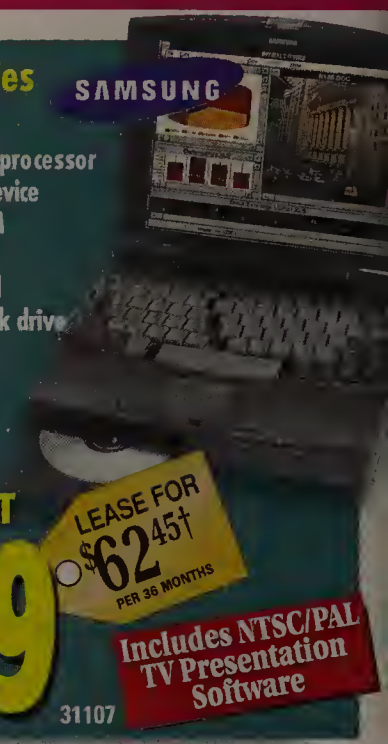

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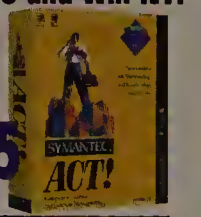

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Clean Up Windows, Open Multiple Files

ALL WINDOWS VERSIONS

JOAN RIVERS ONCE observed that the problem with housekeeping is that you make the beds and do the dishes, and six months later you have to do it all over again. So it is with Windows housekeeping: Over time your Program Groups (Windows 3.*x*) or Start menus (Windows 95) get cluttered. Here's how to go back to square one.

To restore the default Program Manager groups in Windows 3.*x*, switch to Program Manager and choose *File•Run*. Then type **setup /p** (**winsetup/p** in Windows for Workgroups 3.11) and press **<Enter>**.

To avoid strange occurrences, keep your mouse away from Program Manager until the process is complete.

What if your system has become so cluttered that you want to take the drastic step of starting over from scratch? In that case, exit Windows. At the DOS prompt, rename progman.ini by typing **ren progman.ini progman.old**. Then restart Windows. Your Program Manager should be a blank slate. Now run **setup /p** or **winsetup /p** (depending on your version of Windows, as explained above) to rebuild Windows' default Program Manager groups.

At this point, you may be missing one or two custom program groups you had previously. Not to worry. You could recreate them in Program Manager the old-fashioned way, but that's tedious. Instead, use a text editor (two Notepad windows will do) to open both your new progman.ini and progman.old (or whatever you renamed your old progman.ini). Tile the windows for these files (if you're using Notepad, minimize other windows, press **<Ctrl>-<Esc>**, and click *Tile*). Copy and paste the appropriate group#= lines (where # is the number of the group) from the old file to the new. In the new progman.ini, renumber the lines in sequence and save the file. Then restart Windows.

If you really want to clean house, make a note of the .grp files listed in progman.old that you no longer use. Use File Manager to find those .grp files and move them to a temporary location. If after a few days you're certain you don't want those groups back, delete those .grp files.

What about Windows 95? To restore the menus and menu items that have been removed since you installed Windows 95, choose *Start•Run*, type **grpconv /s** and press **<Enter>**. This procedure converts all your old Program Manager .grp files into menus on the Start•Programs menu in Windows 95.

Avoid clicking anywhere (especially on folders) until the conversion process is complete. Unlike with the Windows 3.*x* process, you won't get very far if your Windows folder contains no .grp files. If you have a backup of those files, this may be a good time to restore them.

If you just want to convert one or two of your old groups, choose *Start•Run*, type **grpconv /m** and press **<Enter>**. When prompted, use the dialog box to select the .grp file you want to convert, and click *Open*. Another prompt shows you the full name of the group file as it appeared in Program Manager; click *Yes* to continue. After the conversion, you're prompted to continue by selecting another group. Repeat the process for another .grp file, or click *Cancel* to end the process.

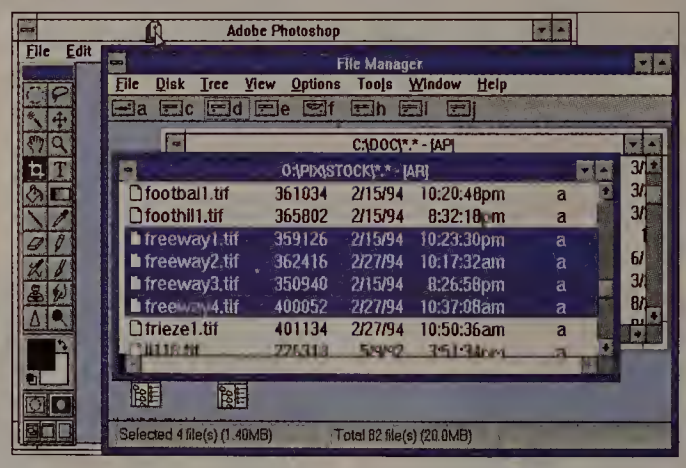

FIGURE 1: OPEN MULTIPLE FILES AT ONCE with a custom file list from which you drag and drop.

OPEN MULTIPLE FILES QUICKLY

HOW COME SO MANY applications these days can have multiple files open at one time, yet the Open dialog box lets you select only a single file? To open multiple files, you have to choose *File•Open*, select one file, click *OK*, and then start over.

It's much faster in both Windows 95 and Windows 3.*x* to use your file management program. First, use File Manager (Windows 3.*x*) or My Computer or Explorer (Windows 95) to open a window that lists the files you need (see **FIGURE 1**). Then select the files and drag them to your application's title bar. If the application is minimized, drag and drop the files on the minimized icon (Windows 3.*x*) or drag to the app's taskbar button, pause while its window is restored, then drop the files on the window's title bar (Windows 95).

Do this often? You can easily create a custom open dialog box for your favorite applications.

In Windows 3.*x* File Manager, select *Window•New Window*, then navigate to the directory where you store files. Arrange the window to your liking, and minimize it within File Manager. Save your File Manager configuration by holding **<Shift>** as you choose *File•Exit*. To use your custom dialog box, switch to File Manager, click the *Window* menu, and choose your dialog box (file list) from the bottom of the menu.

For Windows 95, navigate to a logical place to store your custom dialog box—such as the folder for your application in the Start Menu/Programs folder. Right-click in the folder and choose *New•Shortcut*. For Command Line, type **c:\windows\explorer.exe /e,c:\path\doc**. Adjust the Explorer path as needed, and replace c:\path\doc with the path to the folder where you store the documents for the application in question. If you don't want a tree pane, omit the /e switch (including the comma). Click *Next*, name your shortcut, and click *Finish*. ▶

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Make Office 95 Mind, Enlarge Recycle Bin

WINDOWS 95

A NUMBER OF READERS wrote to point out that the Microsoft Office Shortcut Bar behaves strangely with the tips explained in the May issue ("Customizing Right-Mouse Menus for All Your Windows 95 Files" and "Zip It Up in Windows 95"). With any new command added to your right-mouse menu, a left-click on a button in the Microsoft Office Shortcut Bar runs the new command rather than the Office button function. This problem also occurs if you double-click the Microsoft Network icon on your desktop. Weird, but true. Here are some solutions.

First, the easy fix: Instead of left-clicking items on the Shortcut Bar (or the Microsoft Network icon), right-click and then choose *Open*. This requires one more click, but you don't have to do any more tweaking.

FIGURE 2: KEEP MISSING YOUR TRASH TOSS? Expand your target with multiple Recycle Bin Shortcuts.

Another solution is to dump the Office Shortcut Bar and put its items on a Start menu submenu instead. Here's how: Right-click the *Start* button and choose *Open*. In a blank area of the window, right-click and choose *New•Folder*. Name the folder **Office** (or whatever you wish). Next, right-click the *Office* button on the Microsoft Office Shortcut Bar and choose *Open*. Select the items in this window that you really want in your new menu, and use the right mouse button to drag and drop them onto the Office folder you just created. Choose *Create Shortcut(s) Here*. Finally, navigate to the Startup folder in the Programs folder and remove or delete the Microsoft Office Shortcut Bar Shortcut. Now just choose *Start•Office* to get the same items you had on the Shortcut Bar.

If that's not an option, you can still have your cake and eat it too: First, remove the new items you added to your right-mouse menu: In Explorer, choose *View•Options* and click the *File Types* tab. Select the * file type and click *Edit*. Select an item in the Actions list and click *Edit*. Make a note of the batch file or application listed for 'Application used to perform action'. Then click *Cancel*. With the action still selected in the Action list, click *Remove*, and click *Yes*. Repeat for all actions, then close all dialog boxes.

Next, in Explorer, locate one of the batch files whose menu item you removed (for example, renamer.bat). With the right-mouse button, drag and drop the file on the SendTo folder in the Windows folder. Choose *Create Shortcut(s) Here*. Then open the SendTo folder and rename the Shortcut anything you want (for example, **Rename with extension**). To invoke the batch file, right-click on a file and choose *SendTo* and then your Shortcut's name.

Finally, if you just want a way to change the extension of a file without changing your extension-hiding preference each time, check out the freeware utility Change File Type 96. It's easy to install and use, and it adds an extension-renaming function to your right-mouse menu similar to renamer.bat, but without the side effects. This utility is available on PC World Online as filetype.zip.

A BIGGER BIN FOR EASY TRASH COLLECTION

HIGH-RESOLUTION VIDEO drivers give Windows 95 a bigger desktop—or at least smaller icons. But if the Recycle Bin icon is too small, just dropping things on it becomes an exercise in precision.

You can, of course, adjust the size of all icons: Right-click the desktop, choose *Properties*, click the *Appearance* tab, choose *Icon* from the Item drop-down list, and type in a larger size.

But what if you want to enlarge only the Recycle Bin?

Try this: Use your right mouse button to drag the Recycle Bin a short distance from its current position; when you release the mouse button, choose *Create Shortcut(s) Here*. Do this a half-dozen times or so. Rename each Shortcut with a barely visible name (a comma, a hyphen, a semicolon, or various combinations of these) to avoid an 'Error Renaming File' message. Finally, group all the Shortcuts together on the desktop (see **FIGURE 2**). These multiple Shortcuts together act as a much larger Recycle Bin icon.

If you have difficulty moving a Shortcut without dropping it into the Recycle Bin (or into one of the other Shortcuts), try dropping the Shortcut near, but not next to, the others. Then make gradual adjustments from there.

When you're finished, you'll have a much larger area on which to drag and drop your trash quickly. ▶

WINDOWS TOOLBOX

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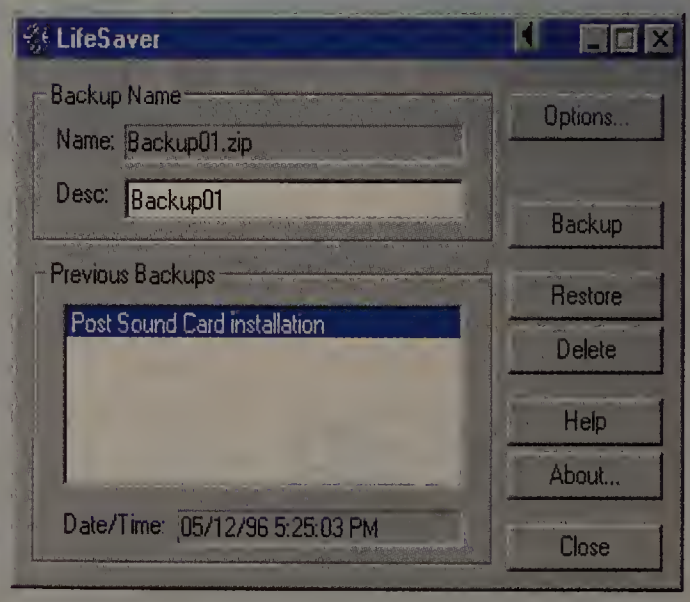

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Losing Your Memory?

WINDOWS 3.X

TO QUICKLY CHECK the amount of memory available, open Program Manager, File Manager, or a Windows accessory and choose *Help•About*. The total KB Free listed for memory is the total of the physical RAM in your computer plus the size of your permanent swap file minus whatever memory Windows and Windows apps are using. But you may open this dialog box to see a shockingly small amount of free memory listed—say, '12 KB Free' when the reading should be closer to 12,000.

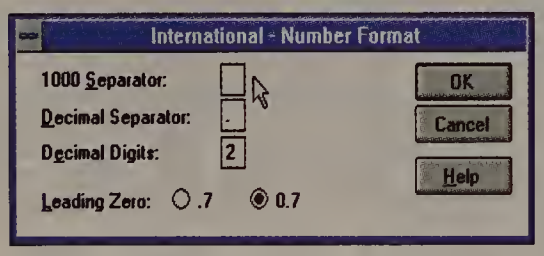

FIGURE 3: CHECK FOR A MISSING THOUSANDS SEPARATOR if your memory reading seems shockingly small.

If this happens to you, head straight to Control Panel. Double-click the *International* icon, and click the *Change* button under Number Format. If the 1000 Separator box in the resulting screen is empty (see **FIGURE 3**), you've found the culprit. The lack of an entry here will not only clip off the end of your memory reading in the About box, but will do the same for file size readings in the Windows 3.1 File Manager status bar. (Because it has a different File Manager, Windows for Workgroups 3.11 is immune to the latter problem but is still vulnerable to the former.)

The fix is easy: Type a comma in the box (or whatever punctuation you use to separate thousands) and click *OK* twice. If that doesn't help, consider a memory upgrade.

Hello NT, Bye-Bye 95

WINDOWS NT

IF YOUR SYSTEM dual-boots between Windows 95 and Windows NT, you may have problems if you go whole hog and uninstall Windows 95. More specifically, if you installed NT after Windows 95, you're likely to get an error message that NT can't start because the ntoskrnl.exe file is missing. And that's because installing Windows NT changed your system configuration and boot partition, making Windows 95's uninstall information out of date. But don't worry, there's a fix, and it's not as drastic as reinstalling Windows NT.

First, start your computer from the first NT setup disk or your NT CD-ROM. When you see a blue screen, press **R** for repair. When prompted, insert the emergency repair disk created during installation. At the next prompt, reinsert the setup disk you used to start the computer. When you're prompted to choose from three options (all of which are selected by default), move the selection highlight to each, and press **<Space>** to deselect the ones you don't need. Make sure that *Verify boot files on your C: drive* is the only option selected; then move the selection highlight to *Continue* and press **<Enter>**. The chkdsk utility then verifies and rebuilds startup files. When prompted, restart your computer.

One last tip: If you have applied an NT service pack, you may need to reapply it after using the emergency repair disk.

Next month, look for a Norton Navigator for Windows tip.

Find the files from this article and additional tips at http://www.pcworld.com/windows.html. Contributing Editor Scott Dunn is a principal author of the PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your tips and questions and pays $50 for published items. See page 14 for contact information.* ■

WINDOWS Q&A

Quick Fixes for QuickTime

BEFORE UPGRADING to Win 95, I used Media Player to watch QuickTime movies, but Win 95 seems less than enamored of it. What can I do?

Alhaji Jalloh, Dale City, Virginia

YOU DON'T SPECIFY what problems you're having with QuickTime movies, but the tips below should help improve their performance:

1. Choose *Start•Settings•Control Panel* and double-click the *Mouse* icon. Click the *Pointers* tab and from the Scheme list, select a collection of black-and-white pointers, such as the Windows Standard. Also, click the *Motion* tab and make sure the Enable check box is empty.

2. Use Notepad or another text editor to open the qtw.ini file in the Windows folder. Find the [Video] heading, and underneath add a line that says optimize=driver (if it's not already there).

3. Check with your video board's manufacturer for the latest drivers, which you may be able to download from their Web site or BBS.

Enjoy the Silent Screen Saver

I LIKE THE screen savers in my Microsoft Plus pack, but my family hates the sound. Can I turn off the screen saver sound only?

Steve Wei, America Online

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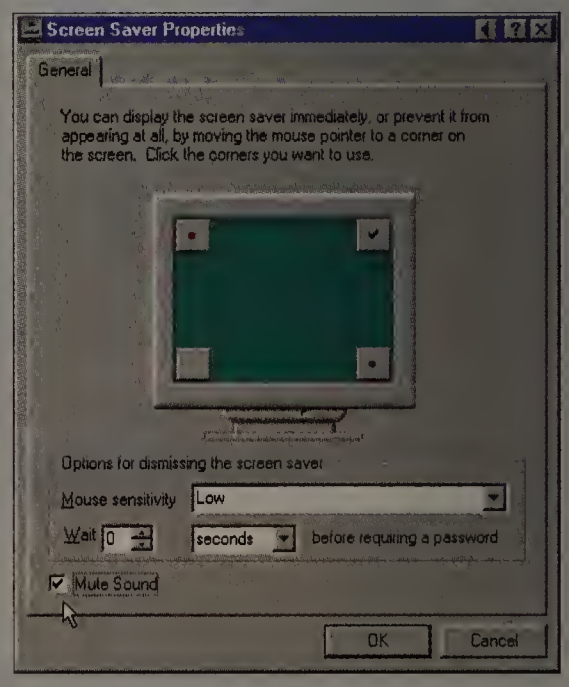

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PCW2

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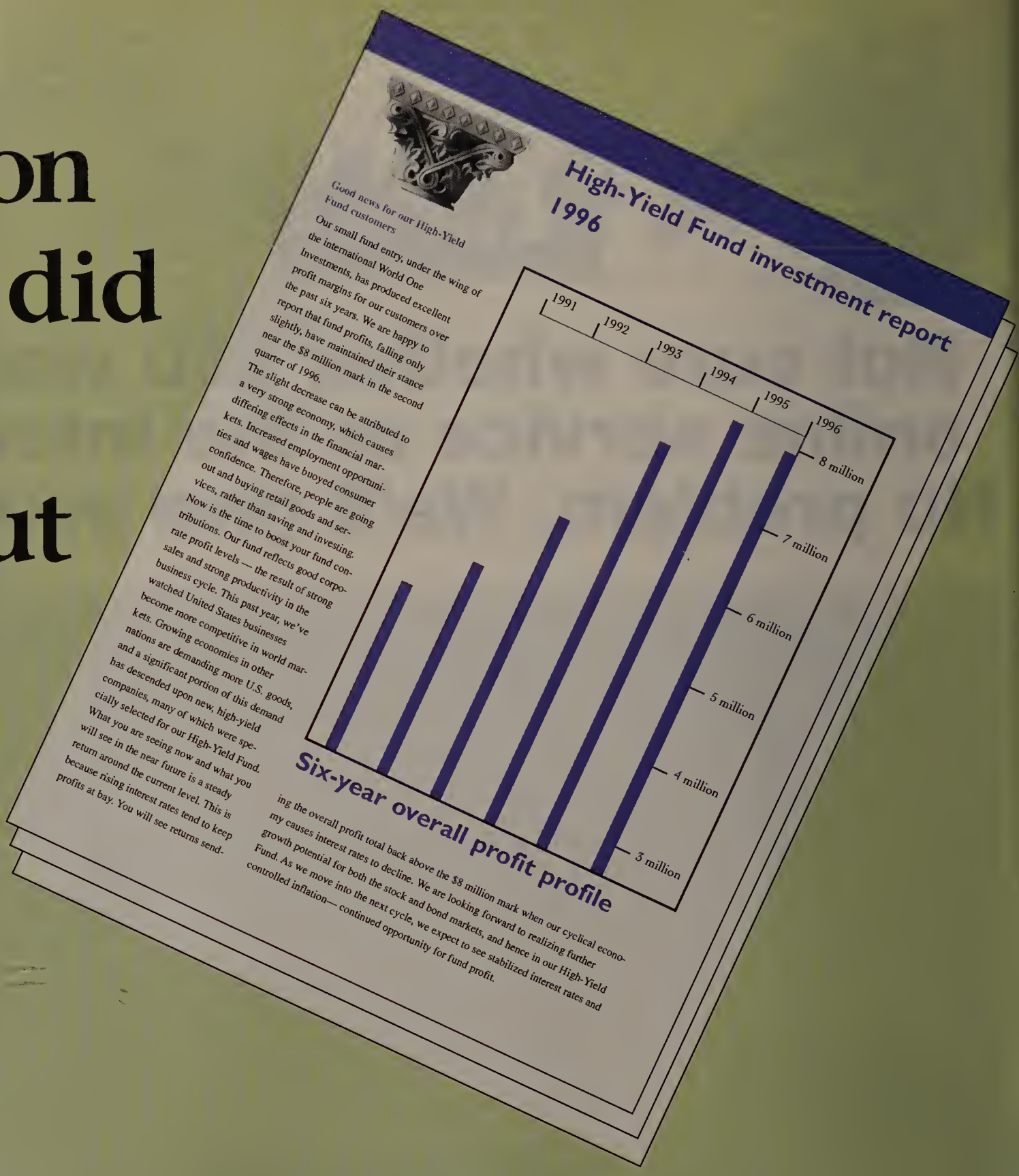

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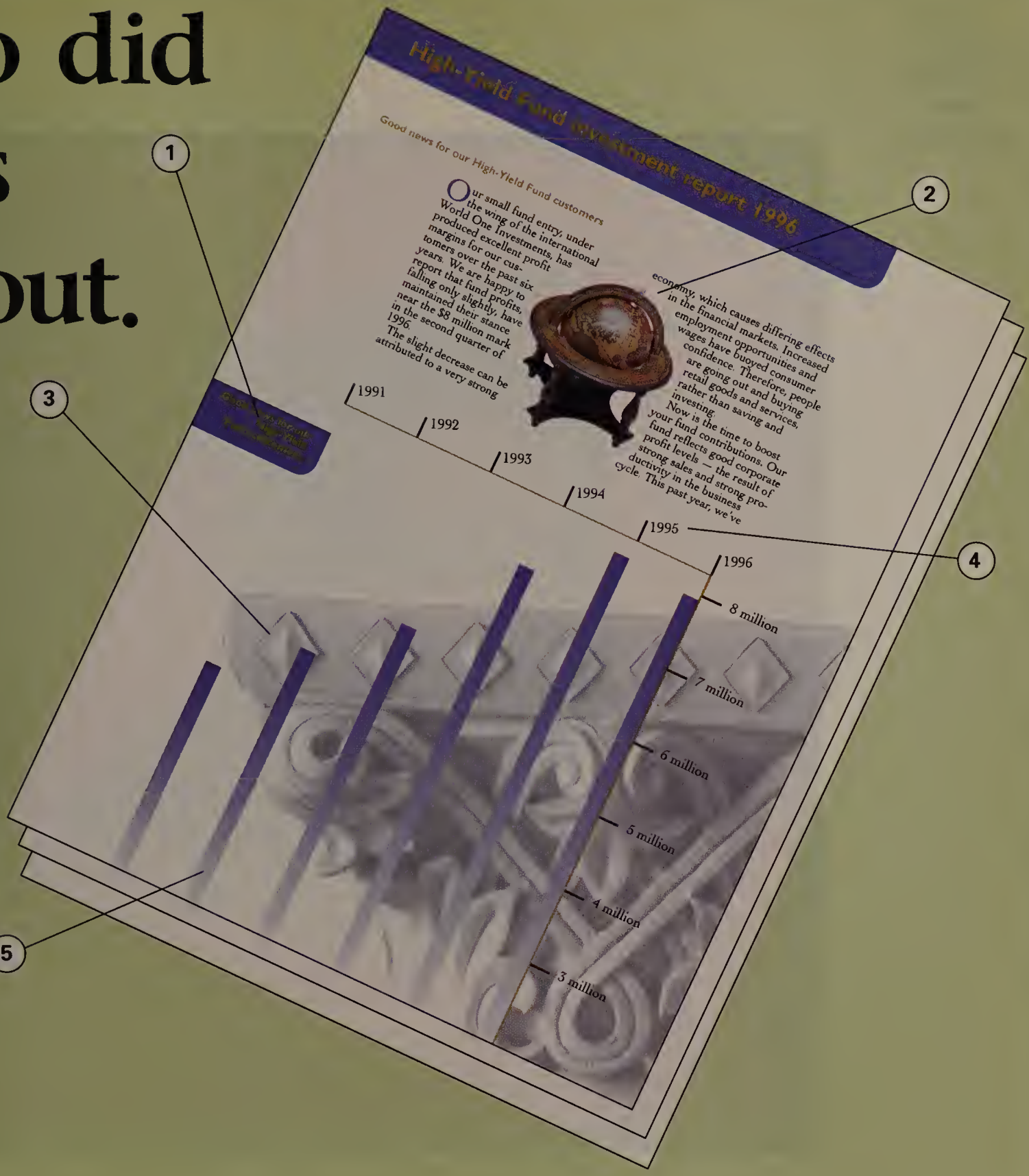

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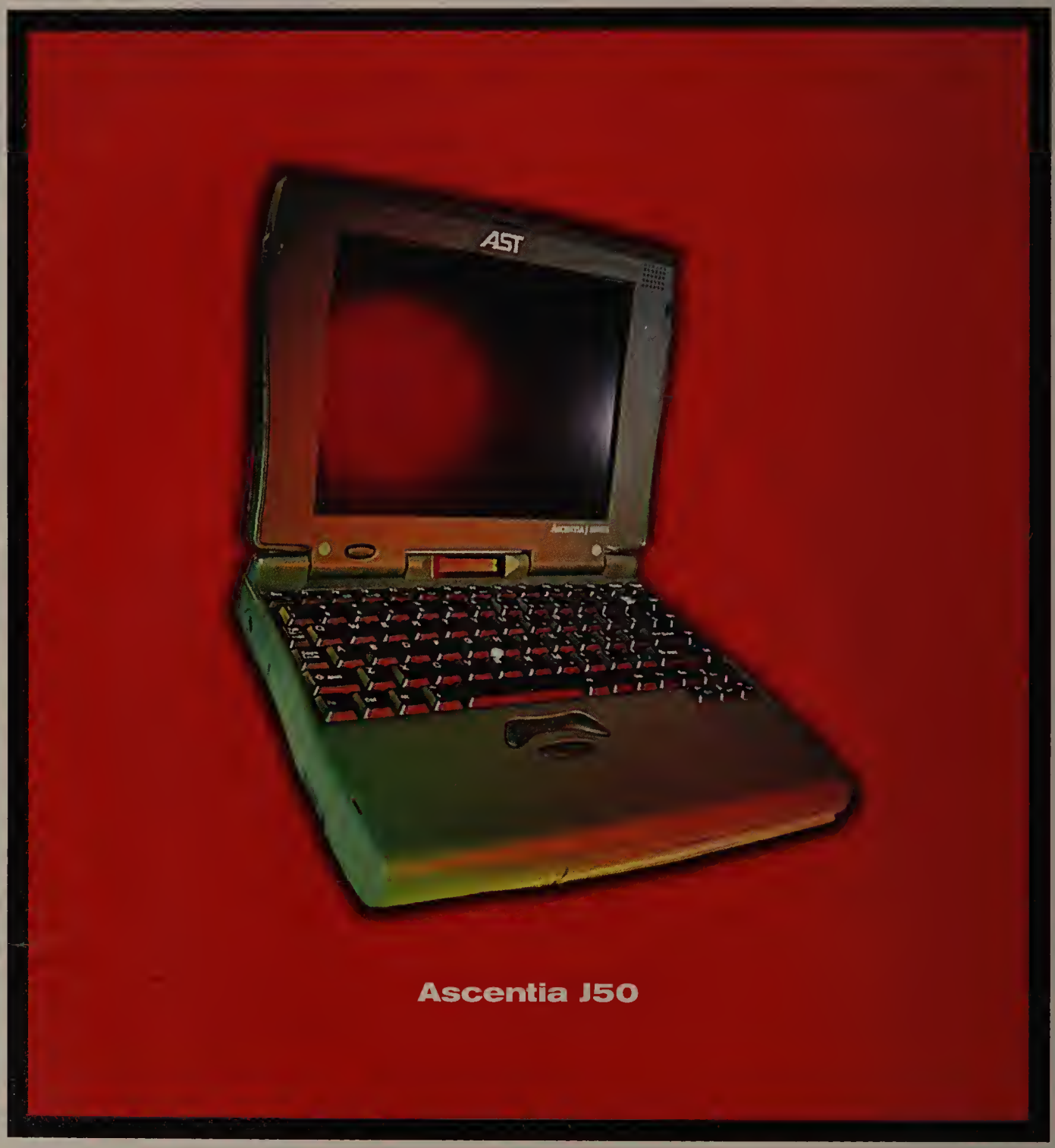

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Add Callouts and Vertical Lines to Word Documents

WORD PROCESSING

BY GEORGE CAMPBELL

TO HIGHLIGHT AND EXPLAIN key passages in an article, many magazine editors put text in boxes in the margins of a page or in other blank spaces, then include lines pointing to the passages. These are called *callouts*, and you can add them to your own documents in Word 6.0 for Windows and Word 7.0 for Windows 95. Just follow the steps outlined below and illustrated in **FIGURE 1**.

1. With your document open, click the *Drawing* button on the Standard toolbar to display the Drawing toolbar.
2. Click the *Callout* button on the Drawing toolbar, then click and hold where you want the line to begin. A box will appear. Keep holding the mouse button down, and drag the box to the desired location, then release the mouse button.
3. Type the text for your callout inside the box. If your callout is too long to fit, resize the box by clicking in the gray frame around the box to select it and then dragging one of its handles. Format the callout text as you would any other text in your document.
4. With the cursor still in the callout box, click the *Format Callout* button on the Drawing toolbar, and make any changes you wish in the resulting dialog box. The default settings in this dialog box allow for the most flexibility in the callout's position. Click *OK*, then click anywhere outside the callout to continue working on your document.

If you need to change the callout text later, just click inside the callout box. You can then edit the text, drag the box to a new location, or resize the box.

QUICK VERTICAL LINES IN WORD 6 AND 7

WHEN YOU NEED TO ADD a vertical line in your document—for example, when the document contains tabular text—you could click the Drawing button on the Standard toolbar, then use the Line tool on the Drawing toolbar. But you may have to manually resize the line when you add to or cut the text that the line delineates.

Fortunately, Word's Tab dialog box provides an easier way:

1. Select *View•Ruler* to display the ruler and get an approximate horizontal position for your line.
2. Place the cursor on the line of text where you want the vertical line to begin. If you're working on text that already exists, select all of the text that you want the line added to.
3. Select *Format•Tabs*. In the Tabs dialog box, type the approximate horizontal position of your line (which you determined in step 1) in the Tab Stop Position field. Click the *Bar* option in the Alignment frame, then click *OK*.
4. Click and drag the resulting tab marker on the ruler to the exact position you want the line to appear.
5. If you've created this bar tab before typing text, or if you need to add to the delineated text, simply start typing. The line will continue to grow in length as you type. When you reach a point where you want the line to end, press **<Enter>**, then drag the tab marker off the ruler.

GET THE STATS ON WORDPERFECT 7 FOR WINDOWS 95 DOCUMENTS

WHEN YOU NEED INFORMATION about the size of your current document in WordPerfect 7, right-click anywhere in the document, and select *Properties* from the resulting menu. In the *Properties* dialog box, click the *Information* tab to find out exactly how many words, lines, and pages are in your document. ▶

Contributing Editor George Campbell is a contributor to The PC Bible *(Peachpit Press, 1995, 800/283-9444).*

STEP BY STEP

Add Magazine-Style Callouts to Your Word Documents

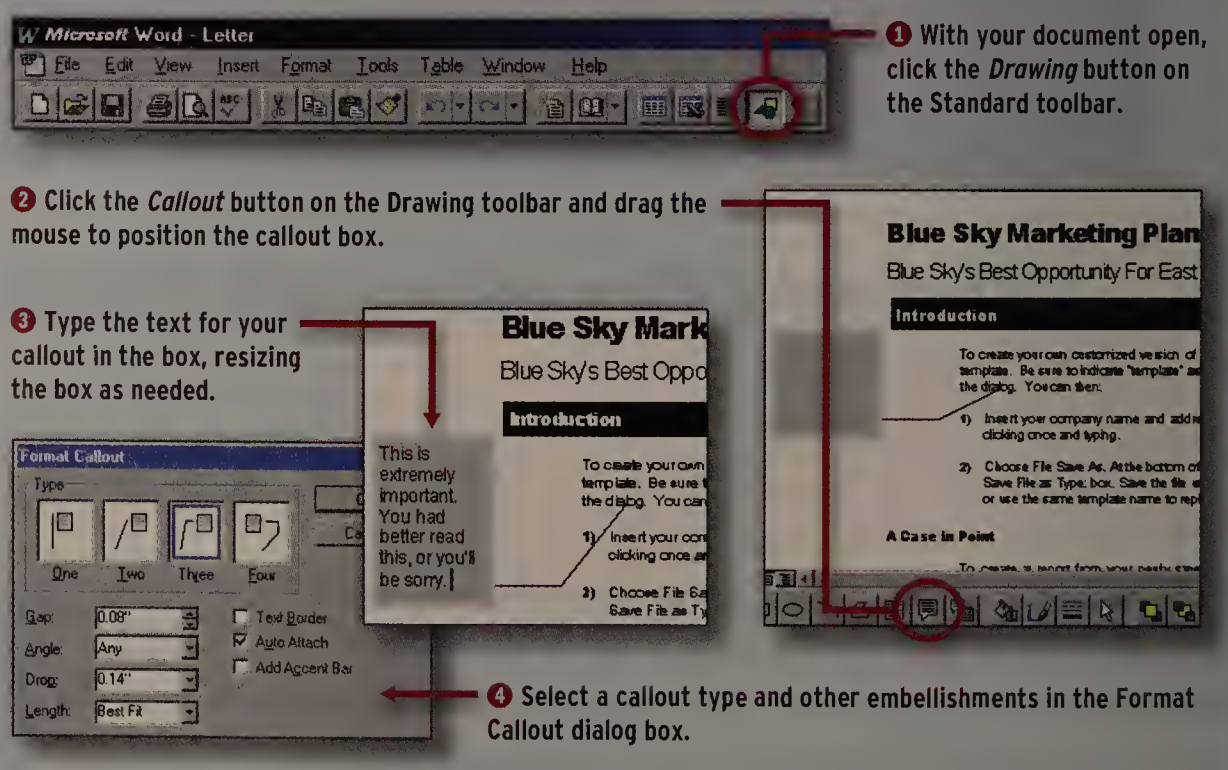

FIGURE 1: CALLOUTS HIGHLIGHT, EXPLAIN, AND DRAW YOUR READERS' ATTENTION to particular passages in a document. They're easy to add to documents created in Word 6 and 7.

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Reset Customized Toolbars in Word 6 and 7

AFTER A RECENT PROMOTION, I inherited a desk, a computer, and a copy of Word from a former employee. The trouble is that she had altered many of Word's toolbars by removing some buttons and adding others.

I'm accustomed to Word's normal toolbars, so I find the customized ones worthless, and I hate using the menus. Somehow I need to get Word back to its original settings. Is there a way to do this, short of completely reinstalling the program?

Linda Whitehall, Chattanooga, Tennessee

THAT'S ONE OF THE PROBLEMS with today's software. Users are given the freedom to customize features until those features are no longer recognizable. A program that's tailored to fit one person's habits and preferences may look like a mess to the next user. Fortunately, it's easy to return Word to its default settings.

Fire up Word, then right-click any toolbar and select *Toolbars* from the menu that pops up, as shown in **FIGURE 2**. In the resulting dialog box, use the cursor keys (not the mouse) to highlight each toolbar in turn. Click the *Reset* button, then click *OK* in the Reset Toolbar dialog box. Make sure to follow these steps even for the toolbars that are not currently checked.

Once you've reset all the toolbars, click *OK* to finish up. The changes will take place immediately. When you exit Word, all your changes will be saved automatically.

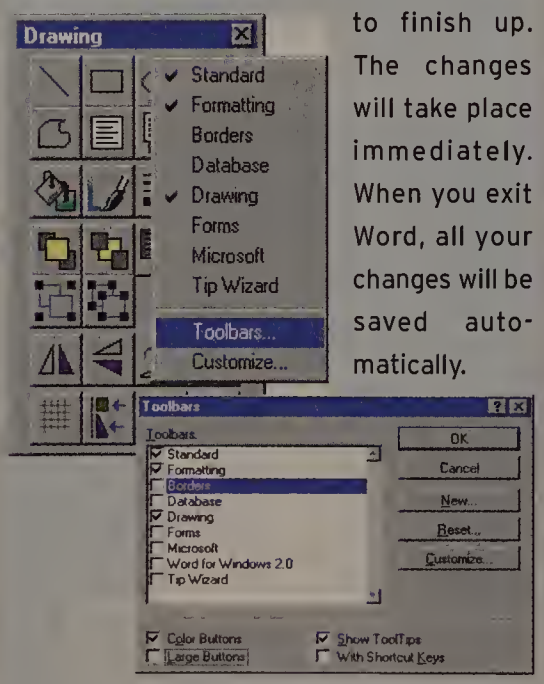


FIGURE 2: TO RETURN WORD'S TOOLBARS to their defaults, click the Reset button.

Backing Up Spreadsheets on the Fly in Excel

SPREADSHEETS

BY RICHARD SCOVILLE

WE STORE ALL of our documents on a network, but the network is not always reliable. Sometimes the server is down when I try to open one of my Excel workbooks, and I have to wait. When I think of it, I save my work *twice*—once on the server and once in a directory on my hard disk. The trouble is, I don't always remember to save a workbook in both places, so the two versions get out of sync.

To solve this problem, I've written a macro that saves my workbook both on the server and on my C: drive.

Ahmad Elmi, Beaverton, Oregon

NICE IDEA, AHMAD. I've enhanced your macro a bit to include a custom dialog box that lets the user enter the server and workstation paths along with the file name. The macro stores the paths in the saved file as special range names so that they're available when you save the file.

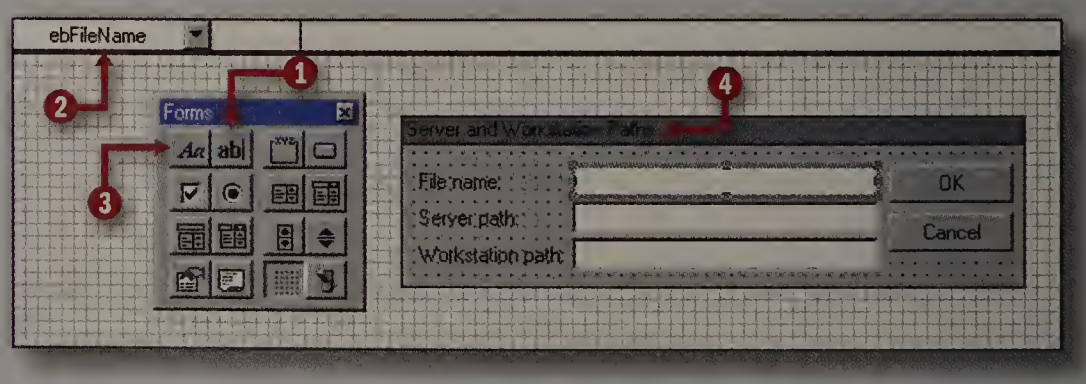
To set up the model, first open a new workbook, or select *Window•Unhide* to reveal your personal macro sheet if you have one. (For complete instructions on creating personal macro sheets, see "Recording Sheet Names in Excel Worksheets," *Application Tips*, September.) Select *Insert•Macro•Module* to create a macro sheet. Double-click the sheet tab at the bottom of the page and enter the name **mSaveTwice**. Select *Insert•Macro•Dialog* and type the name **dSaveTwice**. Then follow the instructions in **FIGURE 3** to create the dialog box.

Now go to the macro sheet and enter the macro shown in **FIGURE 4** (on the next page). Select *File•Save* and enter the file name **SaveTwic.xls**. To make your macro available to any open workbook, save it in your xlstart directory, as described in last month's column.

Next, select *View•Toolbars* and click *Customize*. In the Categories list, select *Custom*. Drag a custom icon onto the worksheet or onto an existing toolbar. ▶

STEP BY STEP

Save an Excel Worksheet in Two Places at Once



1 Click the Edit Box tool and drag the mouse onto the form to create each edit box.

2 Select the first edit box, click here, type **ebFileName**, and press **<Enter>**. Repeat to name the other two edit boxes **ebSPath** and **ebWPath**, respectively.

3 Click and drag the Text tool onto the form to create each edit box caption.

4 Click in the frame of the custom dialog box, highlight the label *Dialog Caption*, then type in the title shown.

FIGURE 3: CREATE A CUSTOM DIALOG BOX to back up or share important Excel worksheets automatically by saving copies to your hard drive and file server at the same time.

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In the dialog box that appears, select *SaveTwice*, click *OK*, and then click *Close*.

To execute the macro, click your custom toolbar button. If the current workbook is new, a dialog box will appear, where you'll specify the file name and paths. If you're saving an existing workbook, the macro will ask you whether you want to replace the existing backup files.

Here's how the macro works. The two Dim statements at the beginning create the variables that will be needed in the macro: Three string variables handle the text that the user enters into the edit boxes of the dialog box, and four object variables simplify the macro by providing short names for the dialog box and its edit boxes. The four Set statements initialize the object variables. If you've stored the macro in any workbook other than Savetwic.xls, change the file name shown in the first Set statement.

If a workbook is new and has never been saved, its Path property is empty. The statement If ActiveWorkbook. Path = "" tests if this is true. If it is, the macro displays the dialog box where you can specify the file name and paths. The expression dSaveTwice.Show activates the dialog box. If you click Cancel instead of OK, the expression will assume the value False, and the macro will finish processing.

The strSPath, strWPath, and strFName statements put the current file name and paths entered into the string variables. The following two If Right statements check the paths to verify they end with a backslash; the macro adds them if needed.

The ActiveWorkbook.Names statements create a pair of special range names to hold the server and workstation paths. An Excel range name can refer to a formula instead of to an actual range of cells, so you can use one name to store a variable in the workbook for later retrieval, as long as you include a leading equal sign and quotation marks. For instance, if the server path is g:\sheets\, the value of the range name would be ='g:\sheets\'.

The ActiveWorkbook.SaveAs statements save the new workbook twice, using the specified server and workstation paths together with the file name.

The strSPath and strWPath statements are executed when the file is saved. These two statements fetch the server and workstation paths from the variable names in the active workbook and load them into the string variables. The Mid() function trims off the equal sign and quotation marks from the stored path.

The ActiveWorkbook.SaveAs statements save the file. ▶

```
Sub SaveTwice()
    Dim strFName, strSPath, strWPath As String
    Dim dSavePaths, ebFileName, ebWPath, ebSPath As Object
    Set dSaveTwice = Workbooks("SaveTwic.xls").Sheets("dSaveTwice")
    Set ebSPath = dSaveTwice.EditBoxes("ebSPath")
    Set ebWPath = dSaveTwice.EditBoxes("ebWPath")
    Set ebFName = dSaveTwice.EditBoxes("ebFileName")
    If ActiveWorkbook.Path = "" Then
        ebFName.Text = ""
        ebWPath.Text = ""
        ebSPath.Text = ""
        If dSaveTwice.Show  "False" Then
            strSPath = ebSPath.Text
            strWPath = ebWPath.Text
            strFName = ebFName.Text
            If Right(strSPath, 1)  "\" Then
                strSPath = strSPath & "\"
            End If
            If Right(strWPath, 1)  "\" Then
                strWPath = strWPath & "\"
            End If
            ActiveWorkbook.Names.Add Name:="ServerPath", _
                 RefersTo:=strSPath
            ActiveWorkbook.Names.Add Name:="WorkstationPath", _
                 RefersTo:=strWPath
            ActiveWorkbook.SaveAs Filename:=strSPath & strFName
            ActiveWorkbook.SaveAs Filename:=strWPath & strFName
        End If
    Else  'The file has been saved before
        strSPath = Mid(ActiveWorkbook.Names("ServerPath"), 3, _
            Len(ActiveWorkbook.Names("ServerPath")) - 3)
        strWPath = Mid(ActiveWorkbook.Names("WorkstationPath"), 3, _
            Len(ActiveWorkbook.Names("WorkstationPath")) - 3)
        ActiveWorkbook.SaveAs Filename:=strSPath & ActiveWorkbook.Name
        ActiveWorkbook.SaveAs Filename:=strWPath & ActiveWorkbook.Name
    End If
End Sub
```

FIGURE 4: SAVE YOUR WORKSHEETS in two places at once with this Excel macro.

Printing More Than One Range on a Page

HOW DO I GET 1-2-3 to print two ranges on the same page?

David Jordan
Wantagh, New York

BOTH 1-2-3 AND QUATTRO PRO—but not Excel—can print multiple ranges, called *collections*, on the same page. In 1-2-3 select *File•Print* (or *Print Preview*) and click *Selected Range;* in Quattro Pro click *Block Selection*. Enter the addresses or names of the ranges you want to print, separated by a comma (for example, **a1..e15,f16..i25**). You can also select the collection before you execute the command: Select the first range, then hold down the **<Ctrl>** key while you select the next range.

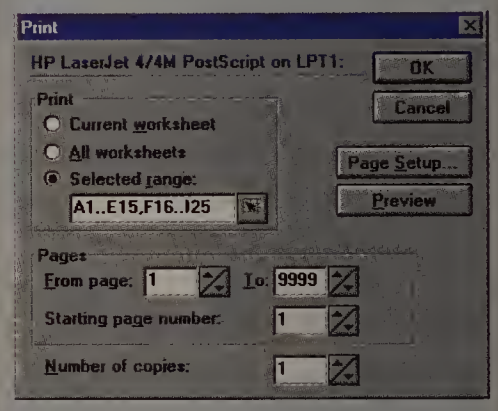

FIGURE 5: PRINT A COLLECTION of ranges by using commas to separate the addresses or names.

Contributing Editor Richard Scoville is a software training consultant based in Chapel Hill, North Carolina.

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Binder Brings It Together

MICROSOFT OFFICE

RICHARD CRANFORD

ONE OF THE BEST THINGS about using an application suite is that it lets you integrate information from more than one application into a single file. Most business reports, for example, include spreadsheet tables, graphs, drawings, and other elements in addition to text. A long-standing dilemma has been how to put all this disparate information into one place for easier organizing and sharing. Microsoft Office 95 comes with just the tool.

Office 95's Binder lets you gather worksheets created in Excel, documents written in Word, and presentations assembled in PowerPoint—as well as files created in some third-party applications—in one file. **FIGURE 6** shows a Binder file with four documents. An Excel worksheet appears in the foreground, but clicking an icon in the left pane brings the Word memo or the PowerPoint slide front and center.

CREATE YOUR OWN BINDER FILE

TO OPEN BINDER, select *Start•Programs•Microsoft Office•Microsoft Binder*. To add an existing document to a Binder file, choose *Section•Add from File*. In the Add from File dialog box, select the file and click *OK*.

Binder displays the section along with the menu from its parent application, plus a Section option. In the Binder's left pane is an icon for each section. Click an icon to load the parent application and the file.

To create a file in Binder, select *Section* (or right-click inside the left pane), then select *Add*. You can add any Office document, as well as files from Office-compatible applications, including Visio and Micrografx. Select the type of document you want to create and click *OK*.

HOW BINDER MANAGES DATA

WHEN YOU ADD A SECTION to a Binder file, the program creates a copy of the source file and stores it inside Binder with an .obd extension. Any changes you ▶

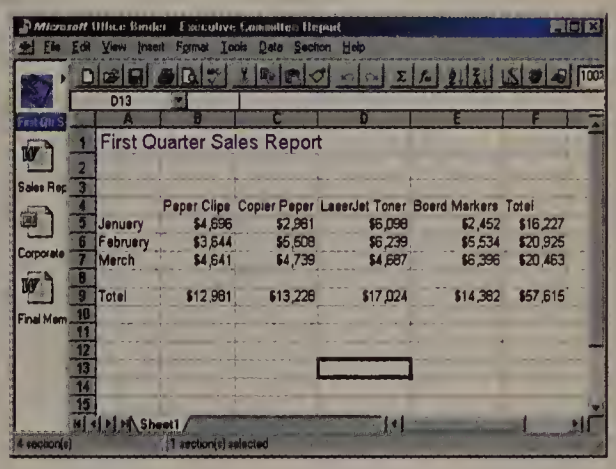
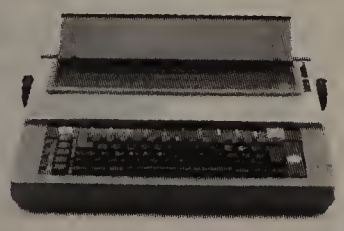


FIGURE 6: COMBINE AN EXCEL WORKSHEET and several Word documents into one Binder file.



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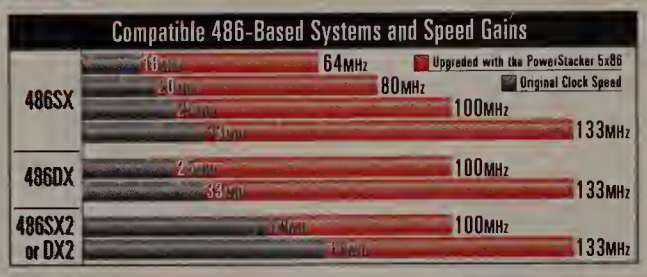

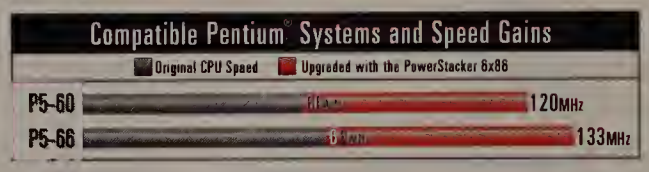

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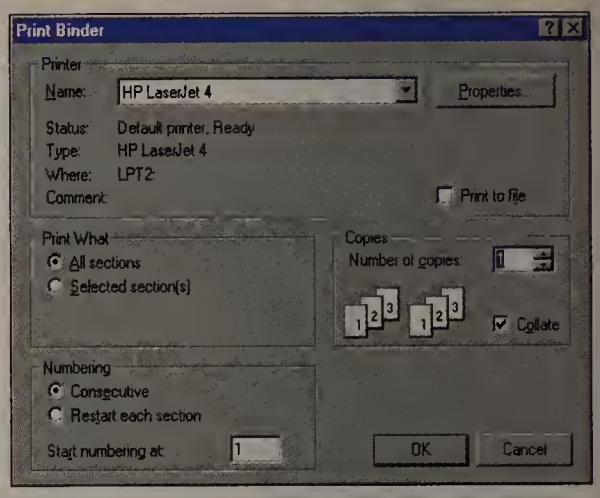

FIGURE 7: PRINT MULTIPLE SECTIONS of a Binder file in one step, and choose to number all the pages consecutively or by section.

make to a Binder section are not passed back to the original file. To keep the copies in sync, choose *Section•Save as File*. To replace the original with the updated file, select the original, click *OK*, and confirm that you want to replace that file.

PRINTING BY THE NUMBERS

ONE OF THE biggest benefits of Binder is that you can print all a Binder file's sections at once. For example, if a Binder file contains a four-page Word document, followed by a one-page worksheet and a three-page presentation, the Print command will print the whole thing and, if you want, number the pages from 1 to 8.

Before you print, you must create headers and footers in each section. In Excel sections, select *Section•Page Setup* and create your headers and footers as you normally would. In Word and PowerPoint sections, you add headers and footers as you do in the stand-alone applications.

To print all the sections in a Binder file in the order in which they're listed in the left pane, choose *File•Print Binder*. In the Print Binder dialog box (see **FIGURE 7**), select *Consecutive* and click *OK*. To print one section, select *Section•Print*. If you've added page numbers, it will start at 1. ■

Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Application Tips welcomes your tips and questions and pays $50 for published items. See page 14 for contact information. Richard Cranford is a freelance writer and programming consultant in Cambridge, Massachusetts.

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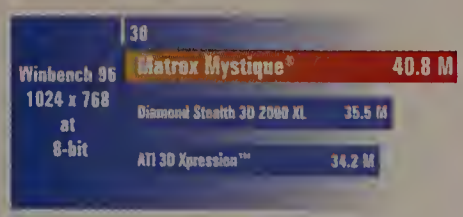

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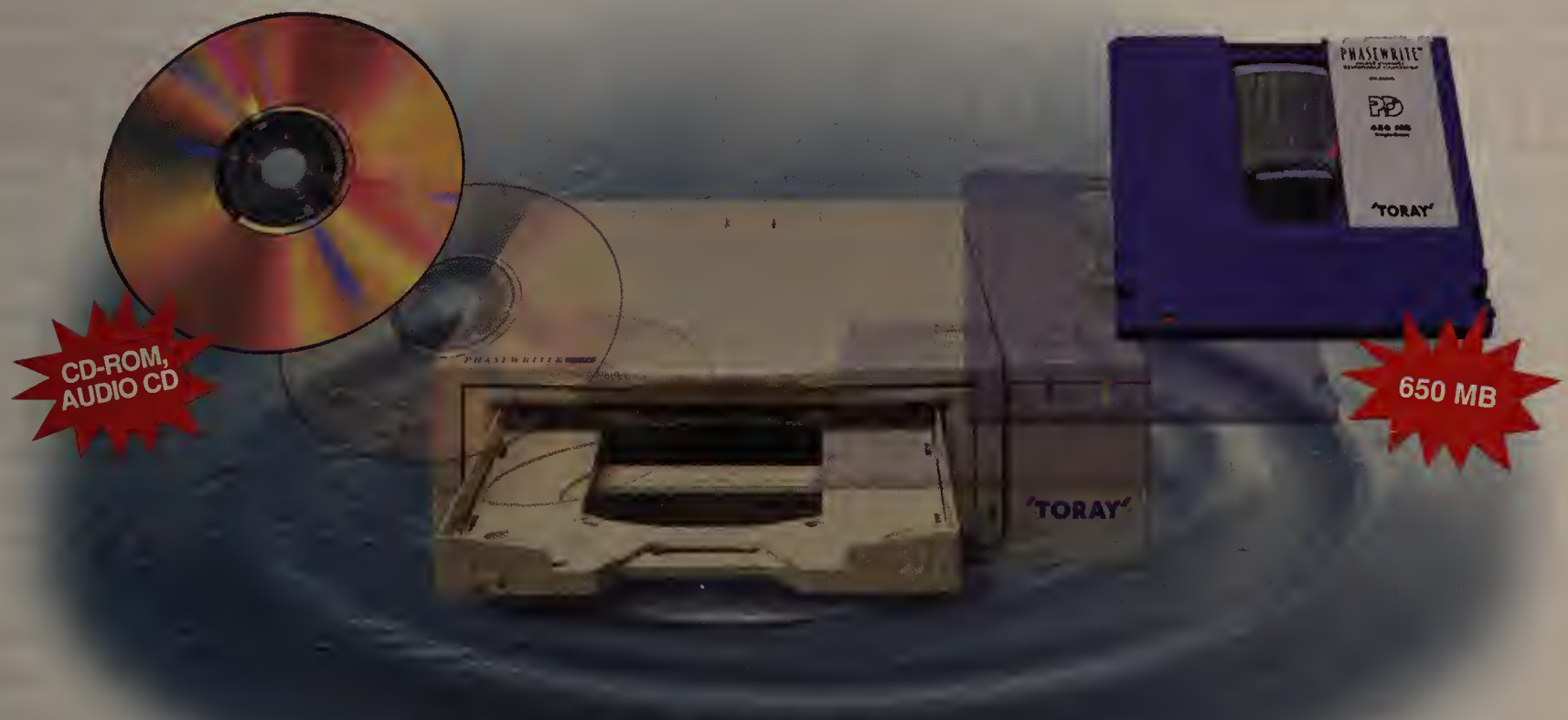

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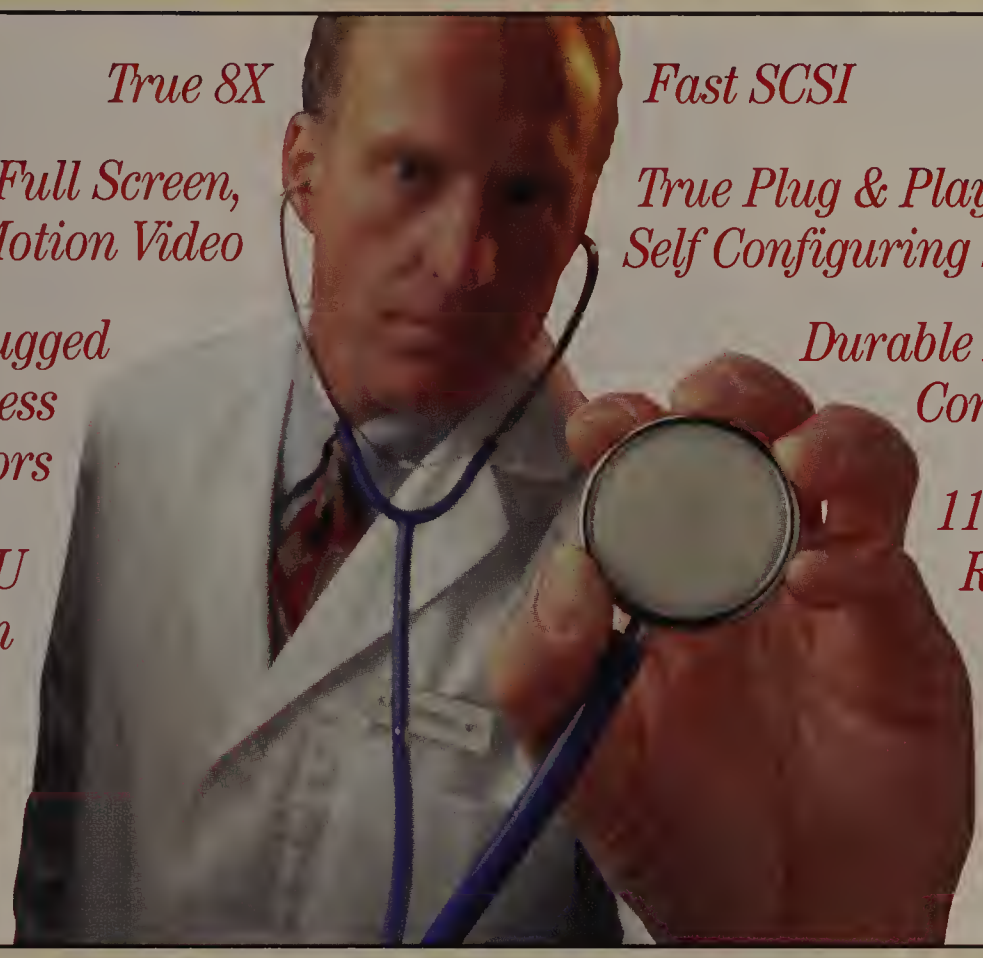

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Finding Special Interest Mailing Lists

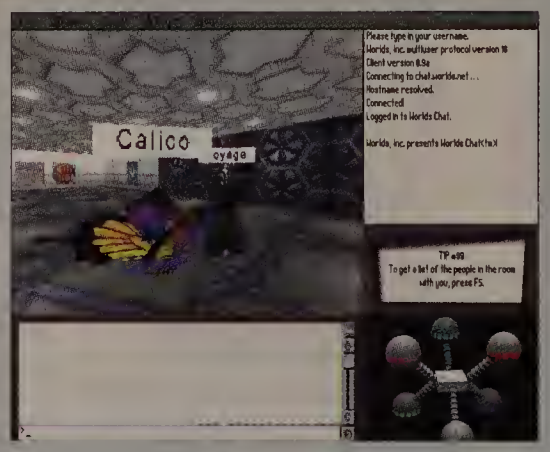
IF YOU'RE LOOKING FOR a lively and in-depth discussion on any topic under the sun, check out private mailing lists on the Internet. The participants are avid and well informed, and the topics—covering everything from Albania to dog training to stamp collecting—are more tightly focused than in Usenet newsgroups.

Unlike Usenet newsgroups, whose discussions you follow by visiting an Internet site, mailing lists are discussion groups to which you subscribe. You send your subscription command to a server. The server then sends you all the messages posted each day on the list's topic.

And while Usenet newsgroups often have moderators who review all submissions, mailing list administrators deal mainly with the operation of the list rather than its content.

Mailing lists can be hard to find. Below is a guide to some of the most popular mailing list searchers. They not only help you locate lists that are of interest to you but also tell you how to subscribe or how to get more information about them.

Note that you can also read the postings from Usenet newsgroups in mailing list fashion. The messages are sent to your private e-mail box, which is convenient if that's your primary link to the Net.



MOVING THROUGH THE WORLDS CHAT space port is like playing a video game in 3-D. You talk to other characters either publicly or through "whispers" by typing text.

Internet Find: Look at Me When I'm Talking to You!

WOULD YOU LIKE to see the people you're chatting with online? Or at least their graphical incarnations? Log in to Worlds Inc.'s Worlds Chat site (http://www.worlds.net/wc/) to start socializing in virtual reality.

First you download the special browser software (it's free, but you'll need a 486 or faster computer to run it). Log on to the Net via a SLIP/PPP connection (full directions are available at the Worlds Inc. Web site). Then fire up the Worlds Chat software and pick an *avatar:* in Hinduism, the human incarnation of a deity; in cyberspace, a 3-D character that represents you. You use your cursor to move your avatar around in 3-D through the Worlds Chat "space port." You transport your character to different levels in the space port by clicking on spheres, and talk to other characters by typing text.

JOIN THE FIGHT AGAINST VANISHING WEB PAGES

IT SEEMS LIKE HALF the Web addresses I type into my browser these days are for pages that no longer exist. Are there plans in the works to make Internet sites more permanent?

Kevin Ortmans, North Platte, Nebraska

YES, KEVIN, THE INTERNET is like quicksand. If I mention a World Wide Web site in an article, it has invariably moved or disappeared by the time the magazine hits the newsstands.

Several groups aim to address this type of problem. The Internet Engineering Task Force (the group of engineers, programmers, and cyberspace politicos responsible for codifying Internet protocols) is working to establish an Internet-wide system of assigning names to sites that is independent of a site's actual location. For instance, if a Web page or gopher database moves to a new Internet service, you could still tap into it using the same address. Web browsers will have to be modified to support this system. For more information, see the IETF's Web page (http://www.ics.uci.edu/pub/ietf/uri/).

Another pioneering effort is the Persistent URL project (http://purl.oclc.org/) at the Online Computer Library Center, a nonprofit organization linking libraries around the world. When you register your Web page with the OCLC, it is assigned a PURL, which is like a Web page URL except that it's supposedly permanent. When you access a page using a PURL address, you're really logging on to the

Mailing List Searchers Find Your Favorite Topics

Mailing Lists Available in Usenet http://www.cis.ohio-state.edu/hypertext/faq/usenet/mail/news-gateways/part1/faq.html

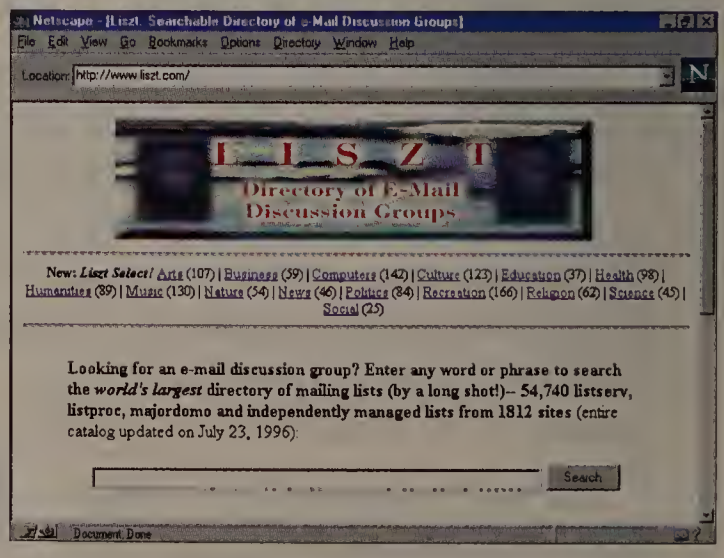
Inter-Links Search List of Discussion Groups http://www.nova.edu/Inter-Links/cgi-bin/lists

Liszt Directory of E-Mail Discussion Groups http://www.liszt.com/

Publicly Accessible Mailing Lists http://www.neosoft.com/internet/paml/

Tile.Net/Lists http://tile.net/lists/

Vivian Neou's List of Lists http://catalog.com/vivian/interest-group-search.html



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OCLC site, which redirects your browser to the page's current location. A PURL's permanence, of course, depends upon the site owner's diligence in registering any changes in the page's location. Needless to say, neither PURLs nor the IETF's efforts solve the problem of pages that disappear altogether.

NAVIGATOR'S GOOD LITTLE HELPERS

WHAT ARE NETSCAPE Navigator helper applications? Are they the same as plug-ins? Where do I find them, and what do they do?

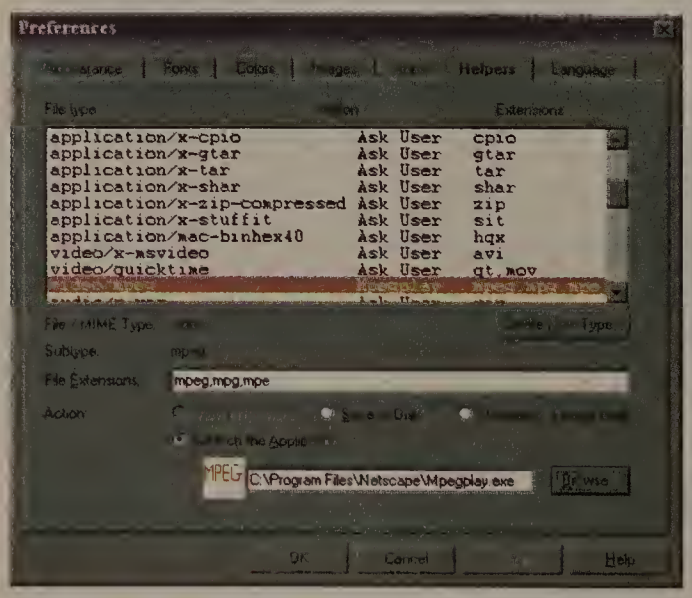
Gloria Hansen, Highstown, New Jersey

A PLUG-IN IS SOFTWARE that gives Navigator extra features. For example, VRML plug-ins let Navigator display 3-D images. Once you've downloaded a plug-in, it pretty much sets itself up as part of Navigator.

A helper application, on the other hand, is an external program (usually freeware or shareware) that Navigator runs whenever it encounters a certain type of file. For instance, you can set up Navigator to run a full-motion video player whenever it comes across an MPEG movie file on the Web. Helper applications tend to take up less memory than plug-ins, and since they're loaded only when you encounter the related file type, they're not eating up resources when you don't need them.

Almost any utility can be set up as a helper application, and you can find helper programs at any major software archive site. For Windows shareware, try WinSite (http://www.winsite.com/).

To install a program as a helper application, select *Options•General Preferences* from the Navigator menu, then click the *Helpers* tab. In the File Type list, click the type of file you want the helper application to act upon (look at the far right column for file name extensions). Click *Launch the application,* then enter the helper application's path and name in the edit box at the bottom of the screen, or click *Browse* to locate it on your computer. Click *OK* to save the changes.



NETSCAPE NAVIGATOR HELPER APPLICATIONS are relatively easy to set up. The shareware program Mpegplay, shown here, will run any MPEG movie files that you encounter on the World Wide Web.

BROADCAST VIA AN E-MAIL MAILING LIST

I'D LIKE TO BROADCAST product announcements via e-mail to several hundred people. Is there an easy way to automate this process?

Paul Livingmore, Colorado Springs, Colorado

IF YOU'RE USING an Internet service, get a copy of my favorite e-mail program, Pegasus Mail for Windows. It's freeware, and you can download it from the Pegasus Mail page (http://www.pegasus.usa.com/software.htm) or from PC World Online (search for pegasus.zip).

To create a broadcast message in Pegasus, click *Addresses* and you'll find a Mailing Lists feature. Click *New List,* enter a list name, and start typing Internet addresses. You can specify such options as delivery confirmation and encryption.

You can also broadcast messages to a mailing list in America Online. I know someone who publishes a newsletter this way. AOL's address book holds 200 e-mail addresses, so he uses seven address books for his subscribers. He sends the messages as blind carbon copies so that subscribers' addresses aren't broadcast too. He also keeps separate lists for the Internet and AOL because AOL sometimes balks at delivering to two different kinds of addresses.

It goes without saying that there is a special place in Internet Hell for people who mass-mail messages to people who have not specifically requested to be part of the list. ■

Tips for Avoiding Cyberspace Con Artists

- Steer clear of investments offered online, either through advertisements on the Web or through messages that are posted in investment-oriented discussion groups. Investment cons are proliferating online faster than shell games on the streets of New York.
- Don't be taken in by people with sob stories who ask you for money or a credit card number to help pay their online bills.
- Be wary of pyramid schemes—you know, those e-mail messages that begin "I can make you money," then detail some ludicrous scheme in which you mail 20 people $10, they mail 20 more people $10, and so on. Not only are these illegal, they don't pay off.
- Never include your credit card number in an e-mail message or type it into an unsecured Web site (you can assume that sites are unsecured unless they advertise otherwise).
- If you want to purchase a product advertised online, do it over the telephone, using a major credit card. Keep your first purchase small. That way, if the business is illegitimate, you haven't lost a lot of money, and your credit card company can help you get your money back.
- Choose and protect your online passwords wisely. Never write them down or reveal them to anyone, even if that person claims to be a representative of an online service. For an easily remembered but secure password, use two familiar words paired with a numeral.
- If you've been conned, contact the attorney general in the state where the scam artist is working (if you can determine that) and tell others on the Internet who may also be targets of fraud.

Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is the author of* Internet for Cats *(No Starch Press, 1995, 800/420-7240).* *See page 14 for contact information.*

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Put FAT Drives on a Diet, Optimize CD-R Backups

EFFICIENCY MEANS GETTING everything you pay for. The decade-old File Allocation Table disk storage system, which worked so efficiently with 286-based PCs, torpedoes the storage efficiency of large hard disks.

The culprit is the size of clusters—the blocks that DOS and Windows use for storing data. All files get stored in one or more fixed-size clusters, and whatever bytes aren't needed in the last (and often only) cluster are wasted. Since the FAT can't divide a drive into more than 65,536 clusters, cluster size increases dramatically with drive size.

Thus, where drives smaller than 128MB use 2K clusters, a drive bigger than a gigabyte has 32K clusters (see **FIGURE 1**). With every file, directory, and Shortcut swallowing at least one cluster, your drive falls victim to cluster waste, and storage space disappears at an alarming rate.

Today's FAT structure imposes another problem—it can't support drives larger than 2GB, although such drives will be common by year-end.

So last spring Microsoft quietly revised its FAT system to accommodate 32-bit entries. The new system, called FAT32, reserves 4 of its 32 bits for future purposes, so each cluster is actually identified with a 28-bit value. Using FAT32, Windows 95 accommodates drives up to 2048GB in size, and on smaller disks it stores files more efficiently with smaller clusters (see **FIGURE 2**).

Enticing as FAT32 sounds, it's not for everyone, principally because Microsoft won't give it to you. It is available only in a new version of Windows 95 (version 950b) that vendors will preinstall in new machines starting in September.

Even if you could get a copy of the updated Windows 95, you couldn't just run a quick program to install the new FAT. FAT32 requires updates to all the Windows 95 disk-based utilities, such as fdisk, scandisk, and defrag, as well as the disk driver, vfat.vxd. You must repartition your hard disk and start from scratch. Moreover, your old third-party utilities such as Norton Utilities won't work under FAT32, so you must contact the publishers for updates.

You can trim the cluster waste without the hassle of upgrading to FAT32. All you need is DriveSpace 3, which is included on Microsoft's Plus Utilities disk.

DriveSpace 3 allocates files in sectors of 512 bytes instead of clusters, eliminating cluster overhead entirely. If you're worried about the reliability of disk compression, you can install DriveSpace 3 without compression by selecting *No Compression (Fastest)* from the Advanced settings menu, then installing DriveSpace.

If you have a lot of small files on your system, you can save dozens of megabytes of disk space.

Traditional FAT Drives Waste Disk Space

Drive size	Cluster size
16MB to <128M8	2K
128M8 to <256M8	4K
256M8 to <512M8	8K
512 M8 to <1024MB	16K
1024M8 to <2048M8	32K

FIGURE 1: DATA CLUSTERS GET BIGGER and less efficient as drives get bigger—a major problem with Microsoft's veteran File Allocation Table system.

New FAT32 Structure Stores Data Efficiently

Drive size	Cluster size
0 to <6G8	4K
6GB to <16GB	8K
16GB to <32GB	16K
32G8 to <2048G8	32K

FIGURE 2: THE REVISED FAT32 ARCHITECTURE cuts down on cluster size so you can store data much more efficiently, and it handles drives up to 2048GB.

SENSIBLE SESSIONS SAVE CD SPACE

THE PRICE OF RECORDABLE CD drives is plummeting below $1000, and blank 650MB discs cost under $10. That makes CD-R awfully intriguing for a variety of uses, many of which violate copyright laws. But two of the best applications for this storage mechanism are quite legal: archiving and backup.

CD-R drives are relatively fast. Even a first generation CD-R drive will move more than 10MB per minute, filling a disc in about an hour. And CD-R offers unbeatable reliability. Once you write to a CD-ROM disc, you can't change a byte. An unalterable record like that can be an advantage if, for example, you need to keep an audit trail.

But there's also an ugly side to CD permanence: If you don't want to fill a disc all at once, you must make multisession CDs. *Multisession* simply means you write to a given CD on more than one occasion or session. Each session requires not only a separate directory—which means a few hundred kilobytes of overhead—but also its own lead-in track, akin to the spiral between tracks of an old vinyl LP record. That lead-in track swallows a full 13MB, so you lose at least that much with every CD session. If you back up a few files every day, CD space disappears faster than beer at a beach party.

The simple rule, then, is to be discriminating in how you back up. Make a full backup with a CD-R so you can reconstitute your system quickly if disaster strikes. Refresh the backup on a monthly schedule, or more often if your budget allows, but use a conventional system for incremental backups in the meantime.

This advice also applies to other CD-R uses. For example, to get the most out of every blank CD, record all your multimedia files in as few sessions as possible.

Winn L. Rosch is a PC World *contributing editor and author of the* Winn L. Rosch Hardware Bible *(Sams Publishing, 1994, 800/545-5914). Hardware welcomes your tips and questions and pays $50 for published items. See page 14 for contact information.* ■

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Leave Room for Drives, Convert MIDI Files

HAVE YOU EVER INSTALLED a hard disk only to find that your CD-ROM–based applications no longer work? The problem is that hard disks come first in the pecking order for drive letters. So when you install a new hard disk, or repartition an existing drive and create additional drive letters, your CD-ROM drive gets pushed down to the next letter available. And the Shortcuts and .pif files that point to CD applications don't get the news.

Let's say you have one hard disk partitioned into drives C: and D:, and a CD-ROM drive installed as E:. When you add that dirt-cheap 1GB drive and partition it into E:, F:, and G:, the CD-ROM becomes drive H:, and Putt-Putt Saves the Zoo goes kaput. (This problem doesn't occur with disk compression utilities, which let you choose the drive letters for compressed volumes and host drives and leave your CD-ROM drive's letter unchanged.)

To avoid having to reinstall applications later, assign a higher letter to your CD-ROM drive now, before you install the holiday season's wave of CD-ROM titles or cave in to hard-disk envy at Egghead.

In Windows 3.1, you can specify the CD-ROM drive letter in the mscdex.exe command in autoexec.bat using the /l: parameter. For example, **c:\dos\mscdex.exe /d:aspicd0 /l:h** links the mscdex utility to the aspicd0 driver that's already loaded into memory in config.sys, and assigns the CD-ROM drive the H: identifier.

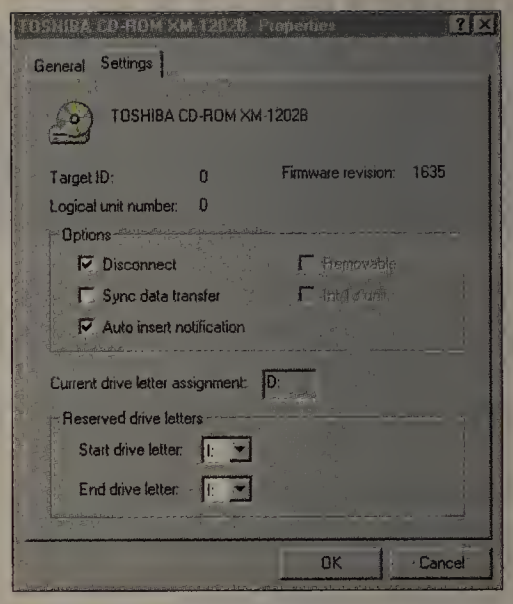

FIGURE 1: ASSIGN YOUR CD-ROM DRIVE a higher letter to save room for new drives.

In Windows 95, choose *Start•Settings•Control Panel*. Double-click *System*, click the *Device Manager* tab, make sure *View devices by type* is selected, click the plus sign next to the CD-ROM branch, select the CD-ROM drive whose letter you want to assign, and click *Properties•Settings* (see **FIGURE 1**). Choose a letter from the *Start drive letter* drop-down list (preferably a higher one, such as I: or J:), and click *OK*.

STEP BY STEP

Make Waves With MIDI Files

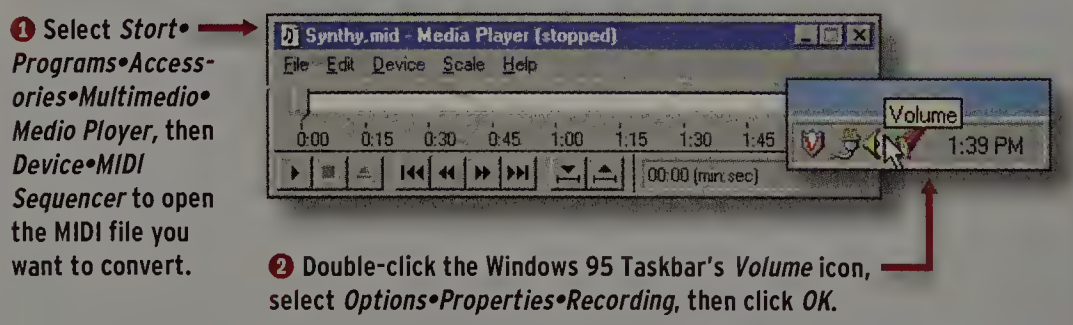

FIGURE 2: CONVERT MIDI FILES TO .WAV FORMAT using Windows' built-in toois. Windows 95 versions are shown here, but Windows 3.1's utilities do the job as weil.

CONVERT MIDI MUSIC TO .WAV FILES

EVER WANTED TO USE MIDI (synthesized) music for a Windows system event or a Web page? You can't—until you convert the music to .wav format.

The Media Player and Sound Recorder utilities in Windows 95 and 3.1 are all you need. Just follow the steps in **FIGURE 2**.

Unfortunately, Sound Recorder defaults to 60-second recordings. You can extend this by dragging the slider to the right during recording, but you'll get a gap in the audio. Instead, try a shareware program like Audio Compositor 1.2 (http://www.eden.com/~mitchell/acdload.htm) or Wavmaker 2.3 for Windows (http://www.abc.se:80/~m9303/index.html). ■

Multimedia Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Spanbauer is the author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240).* *See page 14 for contact information.*

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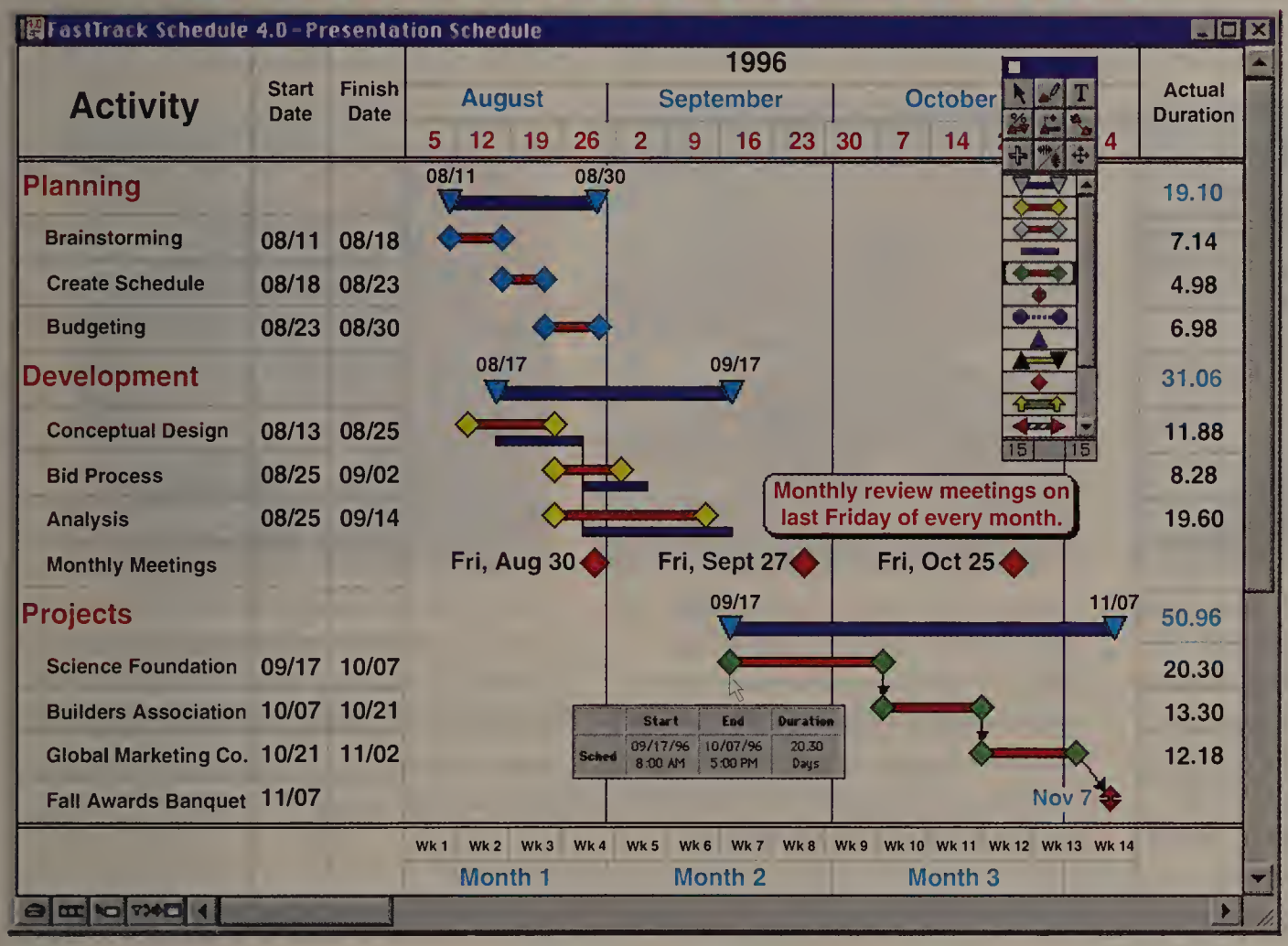

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Installing a Replacement EIDE Hard Disk Drive

IF YOUR PC'S HARD DISK drive is more than a couple years old, it probably lacks the storage space you need these days. But you can solve that problem for less than $300 by equipping your PC with a hard drive that holds up to 1.6GB.

Installing a new EIDE hard drive as a replacement is the most common PC upgrade, but it requires plenty of patience and care to make sure all your applications and data get safely moved to their new home. It's generally better to replace your old hard disk instead of just adding a second drive, and that's what we cover here, but check PC World Online for information on multidrive installations as well as additional tips and hints (http://www.pcworld.com/hereshow/).

Stan Miastkowski is a PC World *contributing editor.*

Be prepared. Back up your hard disk. Prepare a floppy disk from which you can boot your PC (use format A: /s), and copy fdisk.exe and format.com to it. Get out the original disks for your backup program and for Windows 3.*x* or 95 if needed. If your computer is more than two years old, chances are you'll need special software such as OnTrack Disk Manager or a new EIDE controller board.

Pop the hood and the drive. Disconnect the power and data cables from the original drive. Remove and save the drive and the mounting rails, if any. Make a note of the new drive parameters (cylinders/heads/sectors per track). You'll find this information on the drive or its wrapper, or in the manual.

Add the new drive. Mount the drive rails if needed and the drive. If your new drive came with its own mounting screws, use them. If not, use the old ones. But avoid random screws—if they're too long, they can damage the drive's electronics.

Connect the cables. Connect the data cable (bottom) and power cable (top). Make sure that the red wire of the data cable is connected to pin 1 of the drive's connector and that the polarity of the power connector is right. If you have to force it, it's wrong. Double-check all your connections, but don't put the cover back on yet.

Reboot and reconfigure. Start up the PC with the boot disk you made in Step 1. If you're using Disk Manager, insert the disk and run the program. If not, enter the CMOS Setup and enter the new disk parameters if needed. Reboot and run FDISK to partition the drive. Reboot again and format the new drive (format C: /s). Reboot again sans floppy.

Restore your files. If your backup software is Windows 3.*x*- or 95-based, you'll need to do a basic install of Windows first. Restore all the files from the backup. Exit all programs and reboot your PC. Check out all your applications to make sure they're working correctly. If they are, turn off the PC and put the cover back on.

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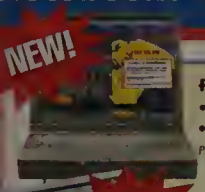

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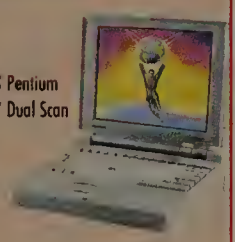

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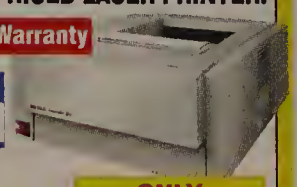

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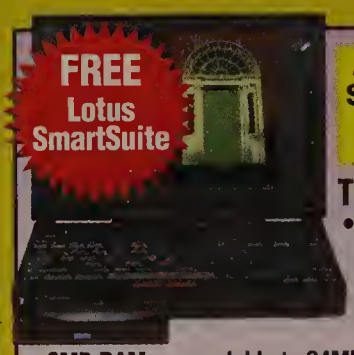

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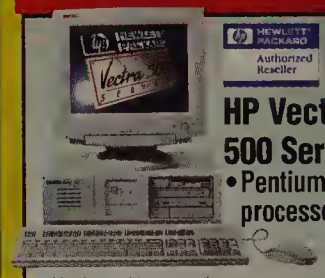

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36716	Advantage 9316 P200 32/3.0GBHD 8X CD MT	$2,849.00

NOTEBOOKS

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32193	TM5200 P120 8/1.2GBHD 11.3" SVGA TFT	$2,899.00
30707	Extensa 560CDT P75 8/1.2 4xCD 10.4 Active	$2,399.00
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33152	Ascentia P50 P133 8/800HD 4CD 11.3" TFT	$3,849.00
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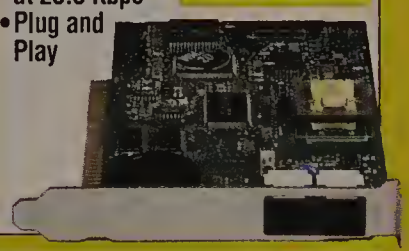

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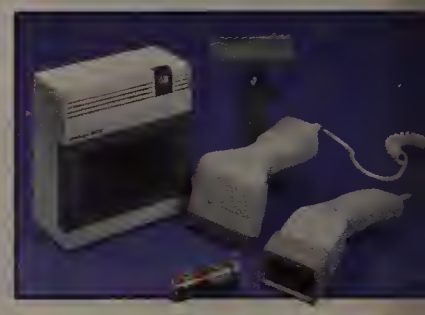

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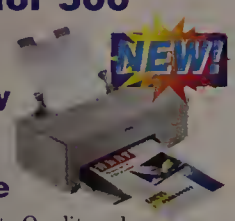

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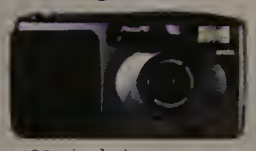

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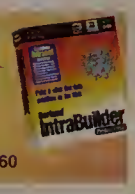

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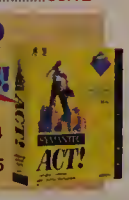

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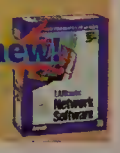

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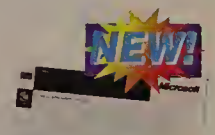

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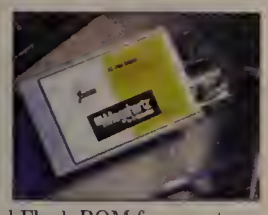

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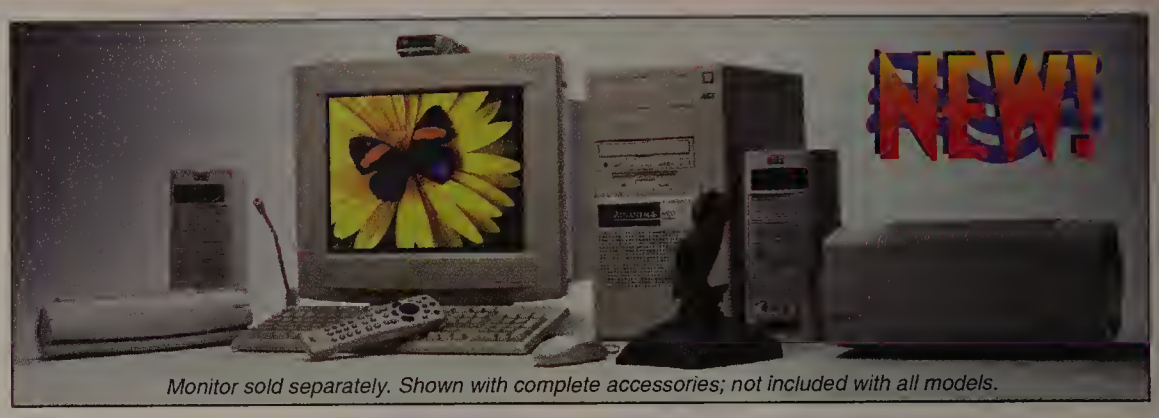

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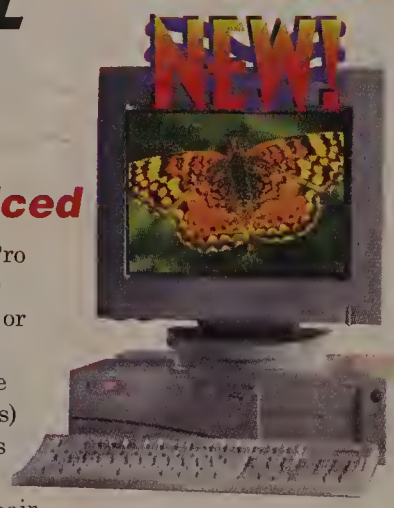
▲ Intel® Pentium® and Pentium Pro processors ▲ 8MB or 16MB EDO RAM standard ▲ 630MB, 1.2GB or 2.5GB SMART EIDE hard drives ▲ 8X CD-ROM drive (Pentium Pro models) ▲ Warranty: 3 years parts; first year labor and on-site repair



Monitor sold separately

Compaq Deskpro 2000 Series

Model	CPU	RAM	Hard Drive	Price	CDW
5100/630	100MHz Pentium	8MB	630MB	$1118.70	72604
5120/1200	120MHz Pentium	8MB	1.2GB	$1401.20	72607
5133/2500	133MHz Pentium	16MB	2.5GB	$1858.85	72613
5166/1200	166MHz Pentium	16MB	1.2GB	$1966.20	72610
6180/1200/CD	180MHz Pentium Pro	16MB	1.2GB	$2542.50	72756
6200/2500/CD	200MHz Pentium Pro	16MB	2.5GB	$3152.70	72762

Monitor and speakers sold separately

Presario 7232 and 7240

▲ 120MHz (7232) or 133MHz (7240) Intel® Pentium® processor ▲ 8MB EDO RAM standard, 128MB maximum ▲ 1.6GB hard drive ▲ 4X (7232) or 6X (7240) CD-ROM drive ▲ 28.8K bps data/fax modem with full-duplex speakerphone ▲ Scanner keyboard with Windows 95 keys (7232 only) ▲ Software: Microsoft® Windows 95 and more! ▲ 3-year limited warranty

Presario 7232 ..... **$1299.00** CDW 72133

Presario 7240 ..... **$1399.00** CDW 72137

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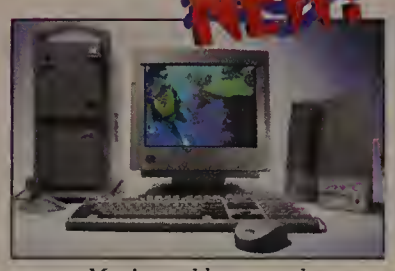

Monitor sold separately

All Aptiva models come with a host of advanced telephone answering capabilities that include a phone answering system, voice mail with remote access, full-duplex speakerphone and more. IBM VoiceType™ Control for Windows, Aptiva's voice recognition feature, permits voice commands like "Open", "Quit", and "Print". Aptiva's Total Image Video provides full screen, full motion MPEG playback for remarkably sharp video images and TheatreSound produces powerful "CD-quality" sound from two amplified stereo speakers.

intel inside pentium processor

■ Intel® Pentium® processors: 133MHz (C33), 166MHz (C65), 200MHz (C73) ■ 16MB RAM standard, expandable to 128MB ■ 1.6GB (C33), 2GB (C65) or 2.5GB (C73) hard drive ■ 8X CD-ROM drive ■ 2MB video memory standard ■ 28.8K bps data/fax/voice modem ■ Windows® 95 software ■ 3-year limited warranty with 1-year on-site repair

Aptiva C33	**$1999.00**	CDW 73083
Aptiva C65	**$2449.00**	CDW 73084
Aptiva C73	**$2899.00**	CDW 73085

PC 340 Series

Exceptional value with Pentium processor power

Monitor sold separately

IBM PC 340 systems provide an excellent combination of price and performance. Whether used as a single, stand-alone system or in a LAN environment, the PC 340 delivers the speed and solid functionality needed for off-the-shelf or customized applications.

■ 100MHz or 133MHz Intel® Pentium® processor ■ 16MB EDO RAM standard, expandable to 128MB ■ Optional 256KB Level 2 cache ■ 1.2GB EIDE hard disk drive ■ Software: Windows® 95, NetFinity and Easy Tools network management tools ■ Lotus SmartSuite license ■ 3-year limited warranty

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PC 340 100MHz Pentium	**$1369.82**	CDW 71857
PC 340 133MHz Pentium	**$1597.85**	CDW 71858

PC 340	**$1139.29**	CDW 71856

■ 100MHz Pentium ■ 8MB RAM ■ 850MB hard drive ■ DOS/Windows V3.1

HP Vectra 510 Series

■ 100MHz, 120MHz or 133MHz Intel Pentium processors ■ 8MB RAM ■ 850MB or 1.28GB hard drives ■ Selected models include 28.8K bps data/fax modems and CD-ROM drives ■ Windows® 95 ■ Pre-installed software: ClarisWorks; Lotus Organizer; Adobe Acrobat and more!

As low as! **$1189.18** CDW 72877

HEWLETT® PACKARD

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The best PCs for small business

Hewlett Packard Vectra 500 Series PCs give you the power of Pentium® processors, the ease and versatility of Windows® 95, the convenience of a built-in 28.8K bps modem (515CCx, 515MCx), Microsoft productivity software and the unmatched reliability of Hewlett Packard products. No matter what your business, there's an HP Vectra 500 Series PC to meet your needs.

■ Intel® Pentium® processors ■ RAM: 16MB standard, 128MB maximum ■ 1.28GB or 1.62GB EIDE hard drive ■ 6X CD-ROM drive ■ S3 Trio64 graphics with 1MB DRAM standard, 2MB maximum ■ 28.8K bps data/fax modem with answering machine and speakerphone (515CCx, 515MCx) ■ Pre-installed Windows® 95 ■ **Pre-installed software: Microsoft® Office Professional with Bookshelf; Microsoft Publisher; Microsoft Plus! Companion for Windows 95; HP Discover; HP Help; HP Printer Ready; Microcom Carbon Copy Host for HP Remote Support; Cheyenne BitWare (515CCx, 515MCx)** ■ 1-year on-site warranty

intel inside pentium processor

Hewlett Packard Vectra 500 Series PCs

Desktop	CPU	RAM	Hard Drive	CD-RDM	Price	CDW
510CD	120MHz Pentium	16MB	1.28GB	6X	$1619.17	72888
Mini-tower	**CPU**	**RAM**	**Hard Drive**	**CD-ROM**	**Price**	**CDW**
515CCx	120MHz Pentium	16MB	1.28GB	6X	$1819.73	72890
515CD	133MHz Pentium	16MB	1.62GB	6X	$1828.93	72891
515MCx	133MHz Pentium	16MB	1.62GB	6X	$2059.95	72892
515MCx	150MHz Pentium	16MB	1.62GB	6X	$2169.25	72893
515MCx	166MHz Pentium	16MB	1.62GB	6X	$2349.03	72894

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TOSHIBA Tecra 730CDT

◆ 150MHz Intel® Pentium® processor ◆ 16MB EDO RAM standard, expandable to 144MB ◆ 2GB removable hard drive, 3.5" 1.44MB floppy drive ◆ 6X CD-ROM drive ◆ 12.1" TFT active-matrix color display ◆ Integrated 28.8K bps (V.34) modem

$5896.51 CDW 73155

Tecra 720CDT

• 133MHz Intel Pentium® processor • 16MB RAM standard • 1.2GB removable hard drive

$5289.11 CDW 66319

Satellite Pro 420CDS and 420CDT

Multimedia versatility and Pentium® processor power

◆ 100MHz Intel Pentium® processor ◆ 8MB EDO RAM standard, upgradeable to 40MB ◆ 810MB (420CDS) or 1.26GB (420CDT) hard drive ◆ Internal 6X CD-ROM drive, swaps with standard 1.44MB floppy drive ◆ 11.3" dual-scan (420CDS) or TFT active-matrix (420CDT) SVGA color display

420CDS **$2489.00** CDW 70245

420CDT **$3398.25** CDW 70246

PRICE DROP!

NEW!

Tecra 500CS and 500CDT

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◆ 120MHz Intel Pentium® processor ◆ 16MB EDO RAM standard, upgradeable to 144MB ◆ 1.26GB hard drive ◆ Internal 6X CD-ROM drive, swaps with standard 1.44MB floppy drive (500CDT) ◆ 12.1" dual-scan (500CS) or TFT active-matrix (500CDT) SVGA color display ◆ Integrated 28.8K bps fax/modem

500CS **$3657.56** CDW 70242

500CDT **$4519.30** CDW 70243

Satellite 110CS and 110CT

The affordable, value-packed mobile computing solution

NEW!

◆ 100MHz Intel Pentium® processor ◆ 8MB EDO RAM standard, upgradeable to 40MB ◆ 810MB hard drive ◆ 11.3" dual-scan (110CS) or active-matrix (110CT) SVGA color display

110CS **$1939.75** CDW 70247

110CT **$2469.07** CDW 70248

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Extraordinary value and performance

◆ 100MHz Intel Pentium® processor ◆ 8MB RAM standard, expandable to 40MB ◆ 810MB or 1.2GB removable hard disk drive ◆ Removable 6X CD-ROM and floppy disk drive ◆ 11.3" DSTN dual-scan (570CD) or 10.4" TFT active-matrix (570CDT) SVGA color display ◆ 6.4 lbs.

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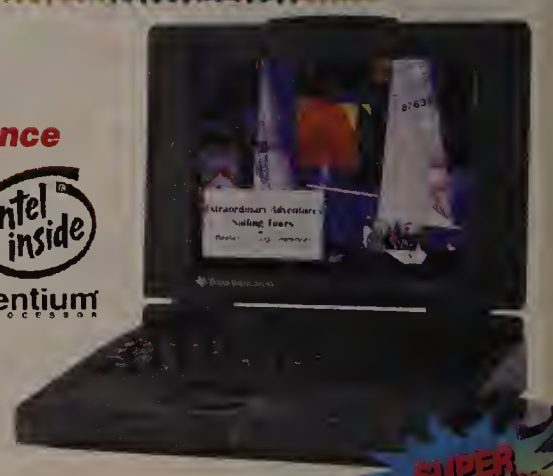

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Portege 650CT

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Only 4.8 lbs!

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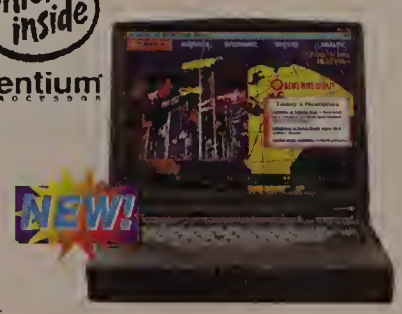

NEW!

◆ 133MHz Intel Pentium® processor ◆ 16MB EDO RAM standard, upgradeable to 80MB ◆ 1.26GB hard drive ◆ External 1.44MB floppy drive ◆ 11.3" TFT active-matrix SVGA color display ◆ Integrated 28.8K bps fax/modem

$4339.19 CDW 70244

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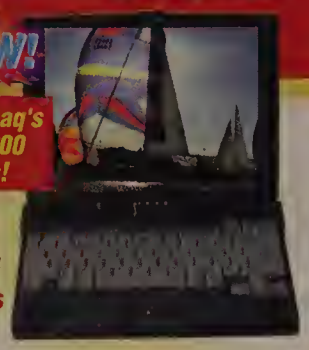

Shown with optional trackball

COMPAQ Armada 4100

Slimline portability and outstanding multimedia capabilities

◆ Intel Pentium* processor ◆ 8MB or 16MB RAM standard, 40MB or 48MB maximum respectively ◆ 810MB or 1.08GB hard disk drive ◆ 11.3" dual-scan or 11.8" TFT active-matrix (4120T, 4130T) SVGA color display ◆ 16-bit stereo sound with integrated speakers ◆ Standard touchpad pointing device ◆ 3-year worldwide limited warranty

4110 100MHz, 8MB, 810MB	**$2496.17**	CDW 71112
4120T 120MHz, 16MB, 1.08GB	**$3744.82**	CDW 71115
4130T 133MHz, 16MB, 1.08GB	**$4417.17**	CDW 71116

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NEW!

A winning combination of features

◆ 100MHz Intel Pentium* processor ◆ 8MB RAM standard, expandable to 24MB ◆ 810MB hard disk drive ◆ 10.4" dual-scan (1120) or 10.4" TFT active-matrix (1120T) color display ◆ 32-bit PCI local bus graphics ◆ 1-year worldwide limited warranty

1120	**$1888.23**	CDW 71110
1120T	**$2208.02**	CDW 71111

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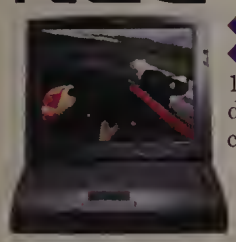
ThinkPad 365ED with 4X CD-ROM	**PRICE DROP! $1969.00**	CDW 68164
ThinkPad 365 Port Replicator/Charger	**$169.47**	CDW 63472

Lotus SmartSuite 96 CD-ROM included with all IBM ThinkPads shipping with the Windows 95 operating system. Diskette copies and hard copy documentation can be ordered for a fee through the IBM fullfillment center at 800-672-6165.

NEC Versa 6000 Series



◆ 100MHz or 133MHz Intel Pentium® processor ◆ 16MB RAM standard, expandable to 48MB ◆ 1.08GB, 1.35GB or 1.44GB hard drive ◆ Includes 1.44MB floppy drive ◆ 6X CD-ROM ◆ 11.3" or 12.1" TFT active-matrix color display ◆ Supports full-screen, full-motion MPEG video (6000H, 6030H) ◆ Cellular-ready 28.8K bps data faxmodem ◆ 6.9 lbs. ◆ 3-year limited warranty

6000H 100MHz, 1.08GB, 11.3"	**$4999.00**	CDW 69805
6030H 133MHz, 1.35GB, 12.1"	**$5799.00**	CDW 69807
6030X 133MHz, 1.44GB, 12.1"	**$6499.00**	CDW 69808

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HEWLETT® PACKARD OmniBook 5500 Notebook PCs

◆ 120MHz or 133MHz Intel Pentium* processor ◆ 16MB RAM standard, expandable to 64MB ◆ 1.35GB or 2GB hard drive ◆ Swappable internal flexible disk drive standard, usable externally ◆ Optional internal 4X CD-ROM ◆ 12.1" TFT active-matrix SVGA color display

120MHz, 1.3GB	**$5285.36**	CDW 69766
133MHz, 2GB	**$5916.26**	CDW 69765

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AST Ascentia P Series

NEW MODELS!

The premium personal notebook

✔ Intel* Pentium® processor ✔ RAM: 8MB, 16MB or 24MB standard, expandable to 40MB ✔ 1GB, 1.2GB or 2.1GB removable hard drive ✔ SmartBay™ houses a 4X or 6X CD-ROM drive, interchangeable with a floppy drive or optional Lithium ion battery ✔ 11.3" dual-scan (CSS models), 11.3" active-matrix (CTS11 models) or 12.1" active-matrix (CTS12 models) SVGA color display ✔ 28.8K bps data/fax internal modem (P40, P50 CTS12 models only)

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Model	CPU	RAM	Hard Drive	CD-ROM	Price	CDW
P30 CSS11	100MHz	8MB	1.2GB	4X	$3351.37	65839
P40 CTS11	120MHz	16MB	1GB	6X	$3287.93	73028
P40 CTS11	120MHz	16MB	2.1GB	6X	$3749.59	73029
P50 CTS12	133MHz	24MB	1GB	6X	$4217.73	73030
P50 CTS12	133MHz	24MB	2.1GB	6X	$4676.95	73032

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TM6020 ..... **$4041.95** CDW 70835

TM6030 ..... **$4806.26** CDW 70837

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SMS Server upg CD 583.18
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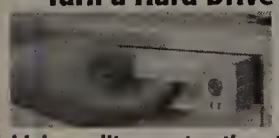
1Gig Jaz external (Iomega case)	$469

100MB Zip disks 2-4 $20 5-9 $17 10+ $15
1Gig Jaz disks 2-4 $99 5-9 $95 10+ $90

Turn a Hard Drive Into a Removable



Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Extremely high quality construction. Metal cartridge and frame, cooling fan. Unit has SCSI ID select on the cartridge. Qty discounts available.

	System	Extra Cartridge	Extra Frame
IDE	$79	$39	$49
SCSI	$85	$40	$54
WIDE SCSI	$129	$64	$75

Weather resistant case to store and transport cartridge $55

• OPTICALS •

All Optical Drive prices below include **1 FREE cartridge.**

230MB	Fujitsu	$339
230MB	Smart Storage Solutions	$339
640MB	Fujitsu (230MB backwards compatible)	$539
640MB	Pinnacle Micro	$769
650MB	PD ROM combination optical & 4XCD	$399
1.3Gig	Maxoptix	$979
2.6Gig	Smart Storage Solutions	$1649
2.6Gig	Pinnacle Micro	$1429
2.6Gig	Maxoptix	$1699
2.6Gig	Hewlett Packard	$2125
4.6Gig	Pinnacle Micro	$1699
52Gig	Maxoptix (does not include free disks)	$4549

• REMOVABLES •

New 540MB MCD drive is backwards compatible with SyQuest 270MB media.

540MB $295 $355 external

SyQuest drives include **1 FREE cartridge.**

135MB external $139 200MB int/ext $399/$459
230MB external $289 270MB int/ext $179/$239

• CD RECORDERS •

BARE DRIVES		
Smart Storage Solutions	2X Write 4X Read	$540
Yamaha	2X Write 4X Read	$550
Yamaha	4X Write 4X Read	$949
COMPLETE KITS		
Smart Storage Solutions	2X Write 4X Read	$619
Smart & Friendly	2X Write 2X Read	$599
HP	2X Write 4X Read	$829
Pinnacle Micro	2X Write 4X Read	$859
Yamaha	4X Write 4X Read	$989

• CD ROM DRIVES •

SCSI

Brand	Spin	Model	Speed	Int	Ext
NEC	4X	CDR222	200ms	$99	$189
Plextor	4.5X	PX43CE	130ms	$230	$320
Teac	6X	CD56S	160ms	$185	$275
Plextor	6X	PX63CS	145ms	$269	$359
Philips	8X	PC80S	195ms	$225	$315
NEC	8X	CDR1410	145ms	$219	$309
Plextor	8X	PX83CS	115ms	$339	$429
ATAPI IDE				**Int**	**Int kit**
OEM	4X	IDECD4X	200ms	$65	$80
NEC	6X	CDR1300	145ms	$79	$94
Acer	8X	AC885A	190ms	$99	$114
Sony	8X	CDU311	160ms	$115	$130
NEC	8X	CDR1400	140ms	$120	$135
Mitsumi	8X	CRMCFX800	150ms	$120	$135
Teac	8X	CD58E	110ms	$120	$135
Toshiba	8X	XM5602B	145ms	$120	$135
NEC	8X	CDR1450	140ms	$150	$165
NEW!	10X	IDECD10X	130ms	$169	$184

CD ROM CHANGERS

Internal IDE					
NEW!	4X	CDR3X4	3Disk	230ms	$89
NEC	4X	CDR4X4	4Disk	250ms	$139
Internal SCSI					
Nakamichi	8X	MJ48S	4Disk	150ms	$549
External SCSI					
Pioneer	4.4X	DRM-624X	6 Disk	190ms	$359
Pioneer	4X	DRM-1804X	18Disk	300ms	$1899

CD ROM TOWERS NEW! 16 Disk $2899 28 Disk $4899

• TAPE DRIVES •

Capacity	Brand & Model	Price
	• SCSI •	
2-4GB	Seagate TSM4000	$309
4-8GB	Seagate TST8000	$399
	• 4mm DAT DRIVES •	
2GB	Hewlett Packard C1534	$609
2GB	Seagate C4320RT	$599
2-4GB	Seagate C4324RP	$679
2-4GB	Hewlett Packard C1536	$699
4-8GB	Sony SDT5000	$809
4-8GB	Seagate C4326NP (DDS2)	$859
4-8GB	Hewlett Packard C1533A	$929
4-8GB	Sony SDT7000 **TURBO SPEED!**	$909
24-48GB	HP External 6 tape loader C1553AX	$2299
32-64GB	Sony TSL7000 8 tape autoloader	$2199
48-96GB	Seagate C4586NP 12 tape autoloader	$2399
	• 8mm DAT DRIVES •	
3.5-7GB	ExaByte EXB8205XL	$1269
7-14GB	ExaByte EXB8505XL	$1889
7-14GB	ExaByte EXB8700LT	$1149
20-40GB	ExaByte EXB8900	$5499
70-140GB	Exa8yte EX810H 10 tape autoloader	$5439
	• DLT DRIVES •	
15-30GB	Quantum DLT2000	$2899
	• QIC •	
800MB	$141	
1GB	$159	
1.7GB	$219	
3.2GB	$245	
4.4GB	$259	
External for Printer Port		
800MB	$259	
1Gig	$269	
Internal IDE		
2-4Gig	$319	
4-8Gig	$399	

Seagate

Price includes Windows backup software and 1 Free Tape.

Bundle Special!
Buy any tape drive with any hard drive and take $10 off the total price.

• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
540M8	14ms	3600	Seagate	ST3541A	3	$151
540MB	14ms	4480	Maxtor	M7541A	3	$159
639M8	10ms	4500	Western Digital	AC2635	3	$160
850MB	10ms	4500	Western Digital	AC2850	3	$165
850M8	14ms	3600	Seagate	ST3851A	3	$171
1080M8	11ms	4500	Fujitsu	M1614T	3	$165
1084MB	14ms	4480	Maxtor	M71084A	2	$185
1250M8	15ms	3600	Quantum	BF1250A	3	$175
1270MB	10.5ms	5400	Seagate	ST51270A	3	$187
1280MB	12ms	5400	Quantum	F81280A	3	$198
1281M8	11ms	5200	Western Digital	AC21200A	3	$192
1336MB	11ms	4480	Maxtor	M71336A	3	$190
1620MB	14ms	3600	Seagate	ST31621A	3	$212
1624M8	10ms	5200	Western Digital	AC31600	3	$225
1625M8	10.5ms	5400	Seagate	ST31640A	3	$228
1626MB	11ms	4480	Maxtor	M71626AP	3	$220
1700M8	11ms	4500	Quantum	SR31700A	3	$218
2004M8	11ms	4480	Maxtor	M72004A	3	$265
2100MB	11ms	5200	Western Digital	AC32100	3	$285
2167M8	10.5ms	5400	Seagate	ST32140A	3	$275
2168M8	10.5ms	4500	Quantum	TM32160A	3	$270
2500MB	9ms	5400	Fujitsu	M1638T	3	$295
2550M8	15ms	3600	Quantum	BF2500A	3	$259
2550M8	11ms	4500	Quantum	SR32550A	3	$299
2559M8	11ms	5200	Western Digital	AC32500	3	$319
3166MB	12ms	5200	Western Digital	AC33100	3	$409
3254M8	10.5ms	4500	Quantum	TM33200A	3	$355
4250MB	10.5ms	5400	Seagate	ST34250A	3	$Call
2 1/2"						
540M8	13ms	4200	Toshiba	MK1924FC	1	$229
810MB	13ms	4200	Toshiba	MK1926FC	1	$329
1350M8	13ms	4200	Toshiba	MK2720FC	1	$519
2100M8	13ms	4200	Toshiba	MK2101MAN	1	$699

• SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	$339	$399
1080MB	11ms	5400	Seagate	ST51080N	3	$259	$319
2147MB	9ms	5400	Seagate	ST32155N	5	$499	$559
2147MB	8ms	7200	Seagate	ST32550N	5	$729	$789
2150MB	8.5ms	7200	Quantum	XP32150	5	$639	$699
4290MB	8ms	7200	Seagate	ST15230N	5	$889	$949
4290MB	8ms	7200	Seagate	ST15150N	5	$969	$1029
4300MB	8.6ms	7200	Quantum	XP34300	5	$900	$960
9080MB	11ms	5400	Seagate	ST410800N	5	$1749	$1849
WIDE SCSI							
1050MB	9ms	5400	Seagate	ST31055W	5	$379	$509
1070MB	8ms	7200	Quantum	XP31070W	5	$299	$429
2147MB	8ms	7200	Seagate	ST32550W	5	$789	$919
2150MB	9ms	5400	Seagate	ST32155W	5	$559	$689
2150MB	8.5ms	7200	Quantum	XP32150W	5	$649	$779
4294MB	8ms	7200	Seagate	ST15150W	5	$1029	$1159
4300MB	8.6ms	7200	Quantum	XP34300W	5	$919	$1049
9100MB	11ms	5400	Seagate	ST410800W	5	$2129	$2219
WIDE DIFFERENTIAL SCSI							
4290MB	8ms	7200	Seagate	ST15150WD	5	$1279	$1409
4294MB	8ms	7200	Micropolis	MC3243WD	5	$899	$1029
9091MB	8.5ms	7200	Micropolis	MC3391WD	5	$1899	$2029
9100MB	11ms	5400	Seagate	ST410800WD	5	$2129	$2319

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Satellite Pro 420

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Processor	Screen	RAM/HD	Price
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Processor	Screen	RAM/HD	Price
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Pentium 133	11.3" Active SVGA	16MB/1.2GB	4499*

* Features 28.8 fax/modem

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- 16MB EDO RAM memory
- 12.1" Super VGA displays

Tecra 500

Processor	Screen	RAM/HD	Price
Pentium 120	12.1" Dual Scan SVGA	16M8/1.3GB	$3699
Pentium 120	12.1" Active SVGA	16M8/1.3G8	4699*

* Features 6X CD-ROM drive

COMPAQ

Armada

Compaq Armada

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Dual Scan	8/810M8	$1879
Pentium 100	10.4" Active	8/810MB	2199
Pentium 100	11.3" Dual Scan SVGA	8/810M8	2479 *
Pentium 100	11.3" Dual Scan SVGA	8/810MB	2899 *†
Pentium 120	11.3" Dual Scan SVGA	16M8/1.1GB	2999 *
Pentium 120	11.8" Active SVGA	16/810MB	3699 *
Pentium 133	11.8" Active SVGA	16M8/1.1GB	4399 *

* Features built-in audio
† Includes 4X CD-ROM drive

LTE 5000 Series

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/510MB	$2830
Pentium 75	11.3" Dual Scan	8/810M8	3210
Pentium 75	10.4" Active	8/810M8	3399
Pentium 120	10.4" Active	8MB/1.35G8	4720
Pentium 100	11.3" Dual Scan SVGA	8/810MB	2849
Pentium 120	11.3" Active SVGA	16M8/1.35G8	4349
Pentium 120	10.4" Active SVGA	16/810M8	3599
Pentium 133	12.1" Active SVGA	16M8/1.35G8	4749
Pentium 133	12.1" Active SVGA	16M8/2.2G8	6299

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Pentium 100	11.3" Dual Scan SVGA	8/810MB	2299 *
Pentium 100	11.3" Active SVGA	8/810MB	2399
Pentium 120	11.3" Dual Scan SVGA	8M8/1.1G8	2549 *
Pentium 120	11.3" Active SVGA	8M8/1.1GB	2949 *

* Includes built-in 4X CD-ROM drive

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- Infrared transceiver for wireless communication

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/810MB	$2699
Pentium 120	12.1" Active SVGA	8/810M8	3749
Pentium 133	12.1" Active SVGA	8M8/1.1G8	4199

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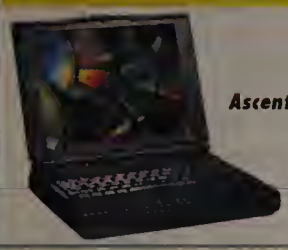
- 11.3" Dual Scan & Active Matrix, 800x600 displays
- 800MB & 1.2GB removable hard drives
- Built-in Soundblaster 16 Vibra chipset

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/800MB	$2999
Pentium 100	11.3" Dual Scan SVGA	8MB/1.2GB	3299
Pentium 133	11.3" Active SVGA	8/800MB	3949
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4249



Ascentia P

AST Ascentia J

- Integrated 14.4/14.4 data/fax modem and audio (selected models)
- PCI bus architecture with 256KB Level 2 cache (16kb on P100, 11.3")
- 10.4" & 11.3" SVGA (800x600) resolution Dual Scan and Active Matrix displays

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan SVGA	B/500MB	$1969
Pentium 75	10.4" Dual Scan SVGA	B/800MB	2049
Pentium 100	11.3" Dual Scan SVGA	B/810MB	1999
Pentium 100	10.4" Dual Scan SVGA	B/800MB	2199
Pentium 100	10.4" Active Matrix SVGA	8/800MB	2499
Pentium 133	10.4" Active Matrix SVGA	8/800MB	2899

NEW MODEL

Ascentia J

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- Up to 133MHz Pentium processors
- Built-in 6X CD-ROM drive
- 2MB video memory
- 16MB RAM memory (selected models)

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Monte Carlo Notebook

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Active SVGA	B/810MB	$2999 †
Pentium 100	11.3" Active SVGA	8/810MB	3149 *
Pentium 120	11.3" Active SVGA	16MB/1GB	4199 †
Pentium 120	11.3" Active SVGA	16MB/1GB	4349 *
Pentium 133	12.1" Active SVGA	16MB/1GB	4999 †
Pentium 133	12.1" Active SVGA	16MB/1GB	5149 *

* Features 2B.B fax/modem † Features Win f/Wrkgrps or Win 95

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Montego Notebook

- 100MHz Pentium processor
- EDO RAM memory
- Built-in 16-bit SoundBlaster compatible audio
- 4.9 lb weight
- PCMCIA 28.8 fax/modem

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Montego

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Active SVGA	BMB/1GB	$2999

NEC

NEC Versa 6000

- Up to Pentium 133MHz processors
- Built-in 6X CD-ROM drive
- 2MB video memory
- Built-in 28.8 cellular fax/modem

NOW AVAILABLE Versa 2400 Call for details.

Processor	Screen	RAM/HD	Price
Pentium 100	12.1" Active SVGA	16MB/1.1GB	$3999
Pentium 133	12.1" Active SVGA	16MB/1.3GB	4999
Pentium 133	12.1" Active SVGA	16MB/1.4GB	5399

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NEC Versa 6000

NEC Versa 4200

NEC Versa 4200

- Pentium 100 and 133MHz processors
- SoundBlaster Pro compatible audio with 2 speakers
- With VersaBay II for optional 2nd battery or CD-ROM
- Full-screen MPEG video, 4 audio ports and mic.

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Active SVGA	8/810MB	$2999
Pentium 133	10.4" Active SVGA	BMB/1.0GB	3B99

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- Built-in 4X or 6X CD-ROM drives (selected models)
- 32-bit PCI Local bus graphics
- Built-in SoundBlaster compatible sound, mic. & speakers (selected models)

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/515MB	$1999
Pentium 100	11.3" Dual Scan SVGA	16MB/1GB	2299
Pentium 100	11.3" Dual Scan SVGA	BMB/1GB	2499†

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Active SVGA	BMB/1GB	$3599*
Pentium 120	11.3" Active SVGA	BMB/1GB	3499†
Pentium 133	11.3" Active SVGA	16MB/1.1GB	3999†
Pentium 133	12.1" Active SVGA (SHA)	16MB/1GB	4499*
Pentium 133	12.1" Active (SHA)	16MB/1.3GB	5699†

* Includes built-in 4X CD-ROM drive
† Includes built-in 6X CD-ROM drive

Sharp PC Series

TEXAS INSTRUMENTS

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TravelMate 6000

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Active SVGA	8MB/1.08GB	$4099
Pentium 133	12.1" Active SVGA	16MB/1.35GB	4889
Pentium 150	12.1" Active SVGA	16MB/1.35GB	5379

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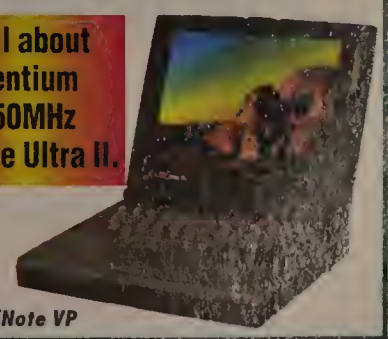

Digital HiNote VP

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Advantage Multimedia — *Product differs slightly from photo*

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- Up to 200MHz Pentium processors
- MPEG Level 1 playback support
- 33.6 data/fax/voice modem on selected models
- Integrated 3-D surround sound
- Video conferencing & tuner card on 9312 model

Processor	RAM/HD	CD-ROM	Price
Pentium 133	24MB/1.6GB	8X	$1699 *
Pentium 166	24MB/2.5GB	8X	2199 *
Pentium 166	24MB/2.5GB	8X	2499 *
Pentium 166	24MB/2.5GB	8X	2599 †
Pentium 166	32MB/2.5GB	8X	2799 *
Pentium 200	24MB/4.0GB	8X	2799
Pentium 200	32MB/3.0GB	8X	2999

* Features a 33.6 data/fax/voice modem
† 9312 model
Monitors priced separately

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- MPEG support with full motion video
- 16-bit WaveTable 3-D Surround Sound
- Comes with 40 software titles
- Up to 200MHz Pentium processors

Processor	RAM/HD	CD-ROM	Price
Pentium 120	16MB/1.6GB	8X	$1969
Pentium 133	16MB/1.6GB	8X	1999
Pentium 166	16MB/2.0GB	8X	2449
Pentium 200	16MB/2.5GB	8X	2899
Pentium 200	32MB/3.2GB	8X	3299

Monitors priced separately

UP TO 200MHz PENTIUM

IBM Aptiva Multimedia Minitower Computer

Monitors priced separately

3-D Surround Sound

8X CD-ROM

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NEC

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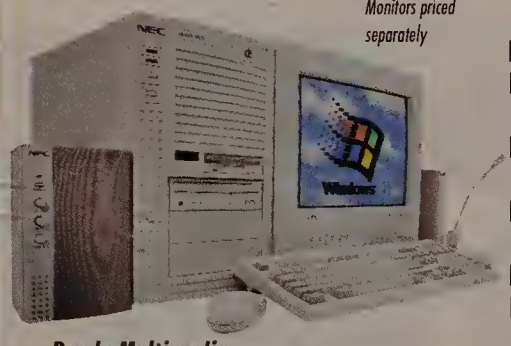

Ready Multimedia

Monitors priced separately

Ready Multimedia For Windows 95

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- 32-bit PCI controller for fast disk performance
- LOADS of FREE software

*4X CD-ROM on 7610

Processor	RAM/HD	CD-ROM	Price
Pentium 120	8MB/1.2GB	4X	$1499
Pentium 120	16MB/1.6GB	6X	1649
Pentium 133	8MB/1.2GB	6X	1750
Pentium 133	16MB/1.6GB	6X	1749
Pentium 150	8MB/1.2GB	6X	1849
Pentium 150	16MB/2GB	6X	1949
Pentium 166	16MB/2GB	6X	2249

Monitors priced separately
*7610 model

TOSHIBA

UP TO 200MHz PENTIUM

Toshiba Multimedia

- Up to 200MHz Pentium processors
- 8X CD-ROM drive
- 33.6 full duplex data/fax modem
- 2MB EDO video RAM
- Tons of FREE software

Processor	RAM/HD	CD-ROM	Price
Pentium 133	16MB/1.6GB	8X	$1799
Pentium 166	16MB/2.1GB	8X	2199
Pentium 200	16MB/3.0GB	8X	2599

Monitors priced seporately

Toshiba Multimedia — *Monitors priced separately*

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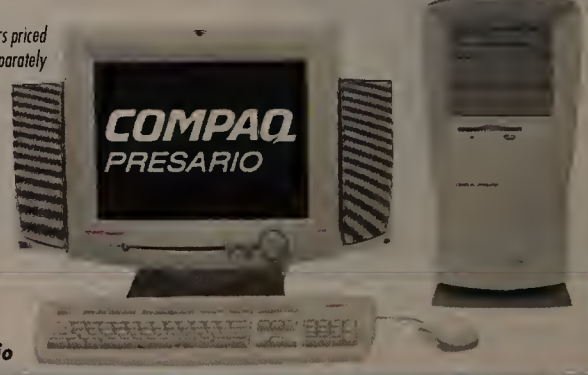
- 3D surround sound with JBL Pro speakers
- Tons of free educational and business software
- 33.6/14.4 data/fax/modem
- Up to 2.5GB hard drives

Processor	RAM/HD	CD-ROM	Price
Pentium 133	16MB/1.6GB	6X	$1899
Pentium 166	24MB/2.5GB	6X	2399

Monitors priced separately

6X CD-ROM

Monitors priced separately



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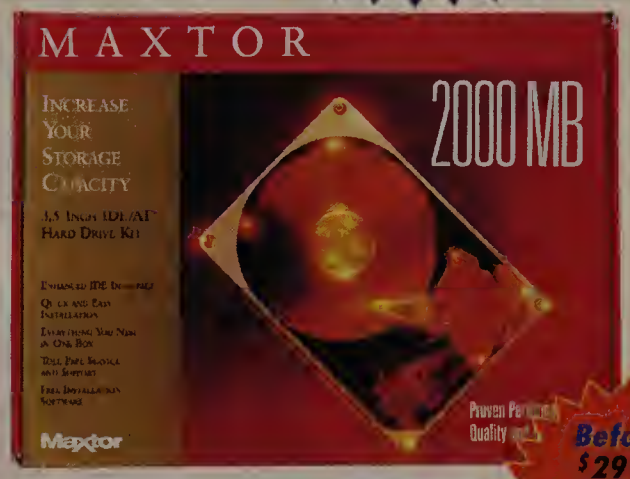

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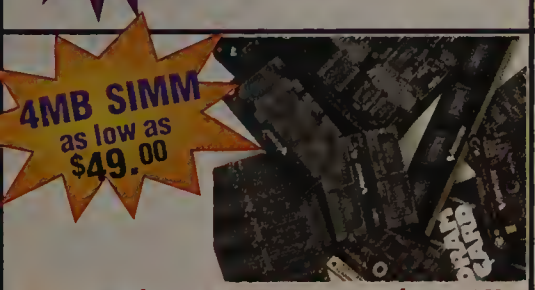

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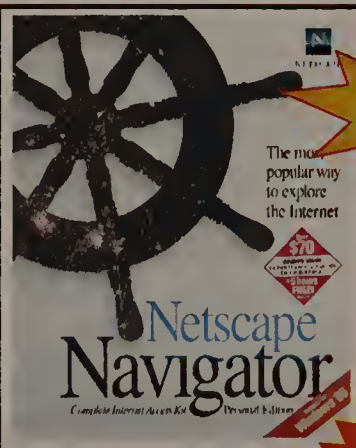

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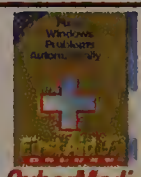

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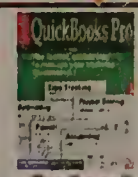

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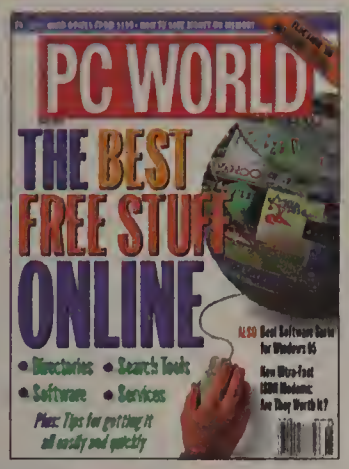

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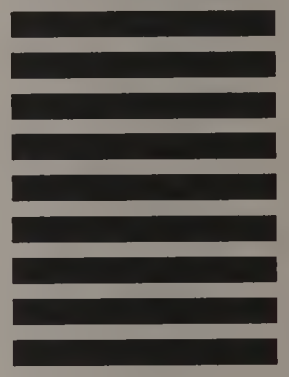

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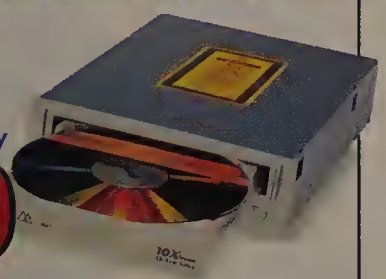

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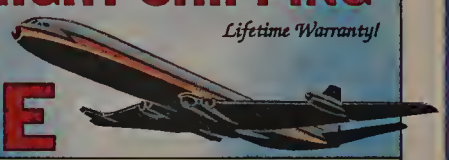

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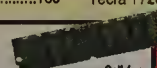

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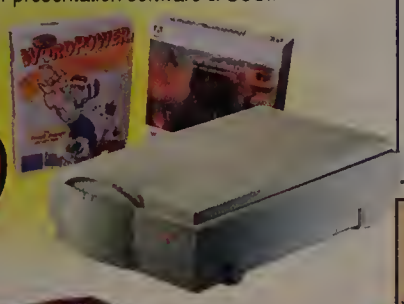

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	40NS	50NS	60NS	70NS	80NS	100NS
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1Meg x 9 (3 chip)	–	–	16.00	10.00	12.00	–
1Meg x 9 (9 chip)	–	–	25.00	20.00	14.00	14.00
4Meg x 9	–	–	58.00	58.00	55.00	–
16Meg x 9 (9 chip)	–	–	195.00	185.00	–	–

72 PIN SIMMS (FPM, EDO)

	60NS	70NS	80NS
256 x 36 1 mg	20.00	19.00	14.00
512 x 36 2 mg	34.00	29.00	19.00
1 meg x 36 4 mg	49.00	49.00	49.00
2 x 36 8 mg	94.00	89.00	89.00
4 x 36 16 mg	144.00	139.00	139.00
8 x 36 32 mg	289.00	279.00	279.00
16 x 36 64 mg	869.00	859.00	859.00
1 x 32 4 mg	39.00	34.00	34.00
2 x 32 8 mg	74.00	69.00	69.00
4 x 32 16 mg	134.00	124.00	124.00
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8 x 64	64Meg	559.00
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AST MEMORY

MODDEL	AMT UPGRADED	AST PART #	PRICE
Bravo LC Series, Bravo MT, Bravo MS, MS-L, Advantage Pro DX33, SX25	4Meg	500987-002	39.00
	8Meg	500987-003	78.00
	16Meg	500987-004	139.00
	32Meg	500987-005	278.00
Premmia LX P/60, MX4/66d, 4/100T, P/60	8 Meg	500987-003	78.00
	16 Meg	501340-002	180.00
	32 Meg	500987-005	278.00
	64 Meg	501569-001	649.00
Premmia 4133, 4133S, 4/50d, 4/60d	8 Meg	501159-002	89.00
Premmia SE 4/33, 4/66d, P/60	16 Meg	501159-003	149.00
Premmia MTE 4/33, 4/66d, P/60	32 Meg	501159-004	329.00
Manhattan G, V Series Server	64 Meg	501159-005	859.00
Power Premium 3/33, 4/33, 4/33S, 4/50d, 4/66d	8Meg	500780-001	168.00
Premium 486/25, 486/25E, 486/33, 486 SX/20			
Premium 386/33TE, 486/25TE, 486/33TE			
Premium II 386/25, 386/33, 486/33, 486 SX/20			
Bravo 486/25, 486/33	2 Meg Kit	500780-005	68.00
Advantage 486/25, 486/33, 486/33P 486 SX/20			
Premium SE4/22	8Meg Kit	500780-001	168.00
Premium SE 4/50 d, 66d, P/60	1 Meg	500780-003	19.00
Prem 386/33T, 386 SX16, Prem.II 386SX.20, 386/25	4Meg	500780-004	84.00
Premmia GX P/90, P/100	8Meg Kit/16Meg Kit	501565-001/501566-001	98/178
	32Meg Kit/64Meg Kit	501567-001/501568-001	319/869
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6450604/92G7196 (2Meg)	70-061, E61, 121, 5OZ, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	39.00
6450608 (2Meg)	70-A21, A-61, 8-21, 8-61, 35SX, 35LS, 40SX, Val Pt. 325T	29.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	59.00
87F9977/92G7199 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	59.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	69.00
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92G7200 (4Meg)	PSI Expert, Consultant, Willow	69.00
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66G0094 (4Meg)	Thinkpad 755, 365, 360, 355, 340, 450	49.00
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(4Meg/16Meg)	Thinkpad 755 Dimm Modules	95/219
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92G7263 (16Meg, 32Meg)	Thinkpad 701C, CS, Butterfly	199/536
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	1Meg Board/4Meg Board	99/201
Deskpro 386 25E/20E	1Meg Module/4Meg Module	39/89
	1Meg Board/ 4 Meg Board	99/201
Deskpro 386/25, 20	1Meg Module/4Meg Module	79/129
Deskpro System Pro 386/33, 486/25, 486/50L	2/8/32Meg	29/89/399
Deskpro 4/66l, 4/33l, 4/25lS, 3?33l, 3/25l	2/4/8Meg	59/89/169
Deskpro "M" Series	Expansion Board 0K	119
Deskpro 450, 466, 4100, 575, 590, 5120, 5133	4/8/16/32Meg	49/99/179/339
Deskpro XE 433S, 450, 466	2/4/8Meg	49/99/179
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Deskpro XL450, 466, XL560, xl566, XL575, 5100 xi590	4/8/16/32/64Meg	39/69/139/299/799
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Proliant 1000 5/60, Prosignia 5/60 (install in pairs)	4/8/16/32	39/69/139/299
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SLT/386	4Meg Module	118305-001	99.00
Concerto, LTE Elite	4Meg	144790-001	59.00
	8Meg	144790-002	119.00
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Contura 320, 325	4Meg	139498-001	99.00
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Contura 400, 410, 420, 430	4Meg/8Meg/16Meg		49/119/219
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2.1 GIG	889	1.3 GIG	768		
THINKPAD 760 – 1.3 GIG	$768	TOSHIBA			
COMPAD		4700/4800 – 810mg	$499		
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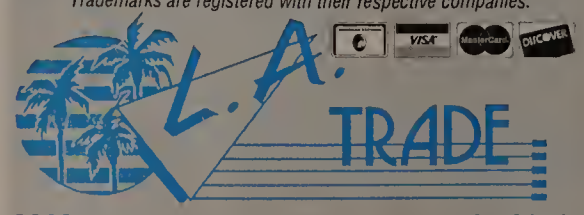

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Tecra 700, 710, 720 (SDRAM)	***8Meg/16Meg/32Meg***		***149/289/599***
Tecra 700, 710, 720	***610Meg/1.3Gig***		***729/810***
T2000SXE/2200SX/T1800, 1850, C	2Meg/4Meg/8Meg	PC-PA2000U	69/99/179
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		79/119/219/349
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	69.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	109.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg/32Meg	PC-PA2014U	199/Call
T3400CT, T2400, T3600	4Meg/8Meg/16Meg	PC-PA2019U	99/139/279
T600, 610, CT Edo	8Meg/16Meg/32Meg		119/199/359
T400CS, 400CDT, T190, 195 Edo	***8Meg/16Meg/32Meg***		***119/199/350***

NOTEBOOK, LAPTOP MEMORY

MODDEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 730, 735C, 760, 780	2Meg/4Meg/8Meg		49/79/139
ACER 763, 765, 782, 784, 786, 787,	4Meg/8Meg/16Meg		69/119/219
ACER 750	4Meg/8Meg/16Meg		69/119/219
ACER Note Pro, ACER Note Lite, 350, 355	***4Meg/8Meg/16Meg***		***59/99/219***
ARM TS38	4Meg/8Meg/16Meg		89/169/299
AST Ascentia P30, P50	***8Meg/16Meg/32Meg***		***Call***
AST Ascentia J10, J30, J50	***8Meg/16Meg/32Meg/40Meg Kit***		***119/219/439/Call***
AST Ascentia 800N, 800N, 810, 910	4Meg/8Meg/16Meg		79/129/219
AST Ascentia 950	8Meg/16Meg		119/219
AST Bravo & Explorer	***4Meg/16Meg***	***501255-001, -002***	***70/210***
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	69.00
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166-001, -003	89/219
AST Power Exec 4/33C	4Meg/16Meg	501318-001,002	89/219
AT&T Globalyst 130, 200, 250	4Meg/8Meg/16Meg		79/119/219
AT&T Safari NSX/20	4Meg	PEC 37651	149.00
Austin OX4, OX2, SX2, SX Series	4Meg/16Meg		79/219
Austin Vista	***4Meg/8Meg/16Meg/20Meg***		***Call***
Canon Innova Book 150	4Meg/16Meg		79/209
Canon Innova Book 200LS	4Meg/8Meg/16Meg/24Meg		69/99/219/349
Canon Innova Book 350CD, 360, 475	***4Meg/8Meg/16Meg***		***69/119/219***
Canon Innova 486-10	4Meg/16Meg		79/219
Canon Notejet 486-25	4Meg/8Meg		79/219
Canon Notejet 486-33, 486C, 25 and 33	4Meg/8Meg		79/219
Canon Notejet 466c, 75, 100	8Meg/16Meg		69/189
Compuadd 450ns, 475ns	4Meg/16Meg		79/219
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Dell Lattitude LM	***8Meg/16Meg/32Meg***		***Call***
Dell Lattitude LX 4100C, MX, MC, M	4Meg/8Meg/16Meg		79/119/219
Dell Lattitude XPI	4Meg/8Meg/16Meg		79/119/219
Dell Lattitude XP, 475, 4100, 4100CX	4Meg/16Meg		79/219
Dell Lattitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		79/219
DTK, DTN 4T 100P, 5P60	4Meg/16Meg/32Meg		119/299/599
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg		79/119/219
Epson ActionNote 700, 700C, 700cx	4Meg/16Meg		89/219
Epson ActionNote 800, 880, 866c	4Meg/8Meg/16Meg/20Meg		79/119/219/349
Epson ActionNote 890	***4Meg/8Meg/16Meg***		***79/119/219***
Epson ActionNote 4000 Notebook	8Meg		119.00
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50	6Meg		119.00
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	89.00
Fujitsu N851000	***8Meg/16Meg/32Meg***		***219/399/599***
Fujitsu Ergolite Series	***4Meg/8Meg/16Meg/32Meg***		***Call***
Fujitsu Monte Carlo	***8Meg/16Meg/32Meg***		***119/239/479***
Gateway 2000 Colorbook 4/33	4Meg/16Meg		79/219
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		159/759
Gateway 2000 486 Handbook or Liberty	4Meg/16Meg		79/219
Gateway 2000 Solo Series	4Meg/8Meg/16Meg		89/129/259
HP Omnibook 300, 480, 425	2Meg/8Meg		83/129
HP Omnibook 530, 600	4Meg/8Meg/12Meg		89/119/219
HP Omnibook 4000	4Meg/8Meg/16Meg		99/149/299
HP Omnibook 5000	8Meg/16Meg/32Meg		149/289/499
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Lexmark SE10	4Meg/8Meg		119/249
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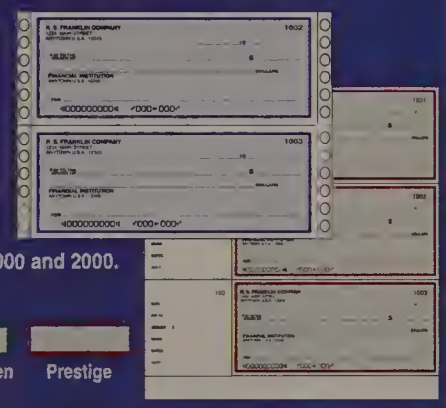

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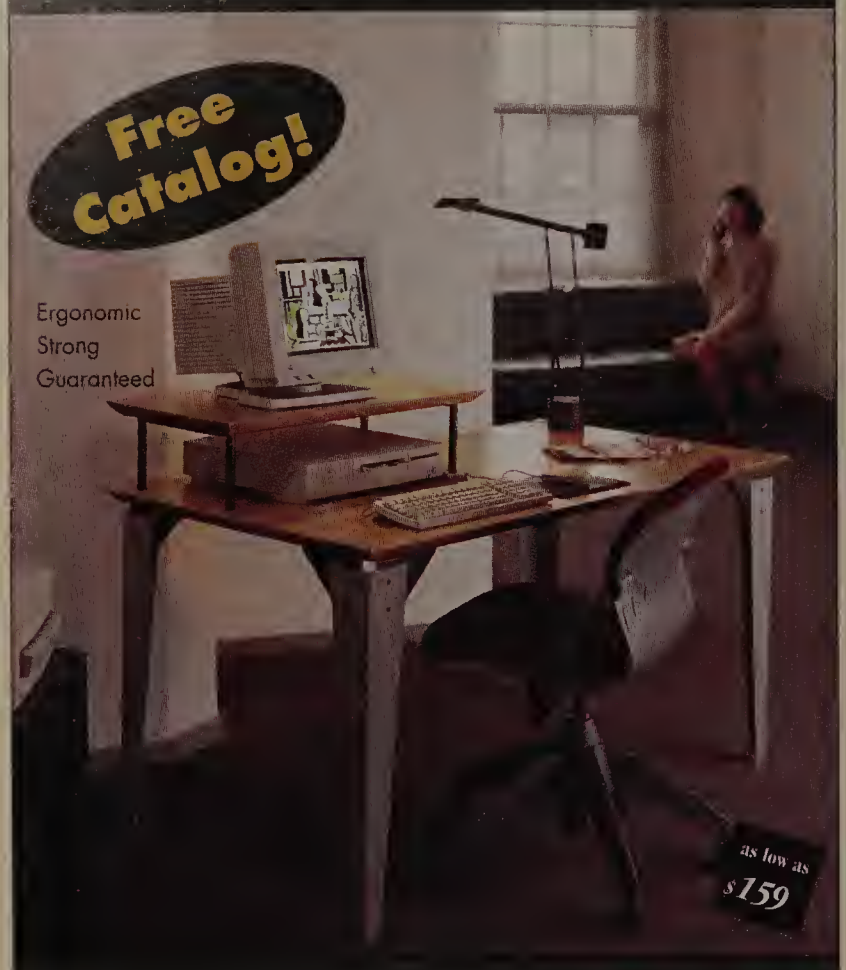

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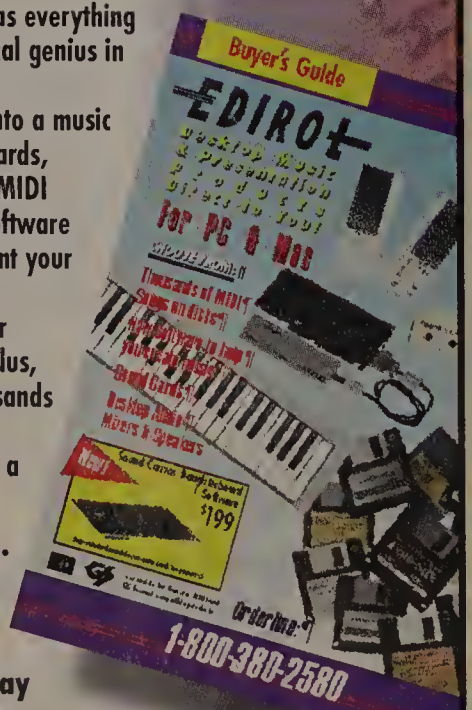

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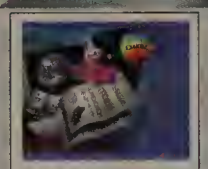

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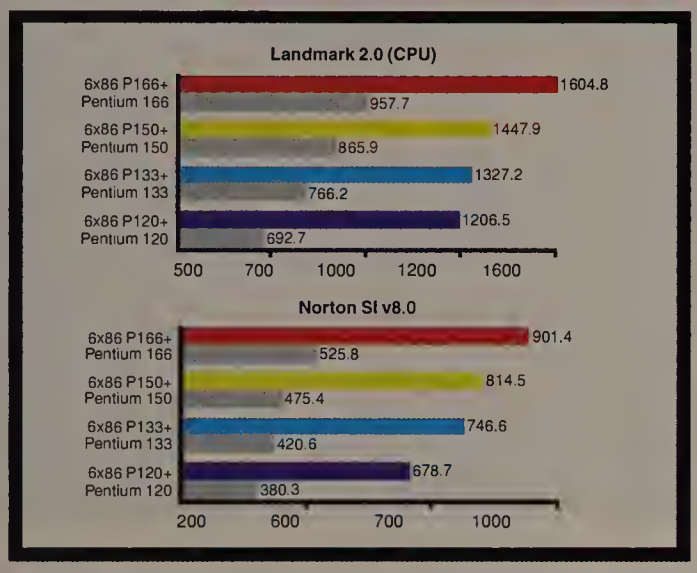

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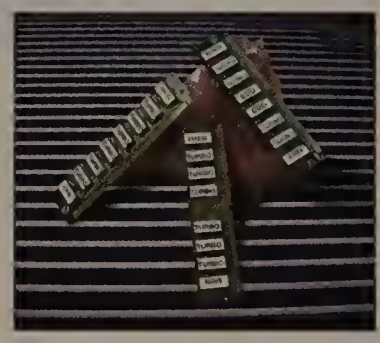

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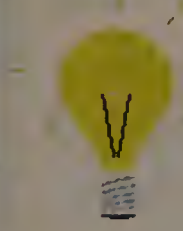

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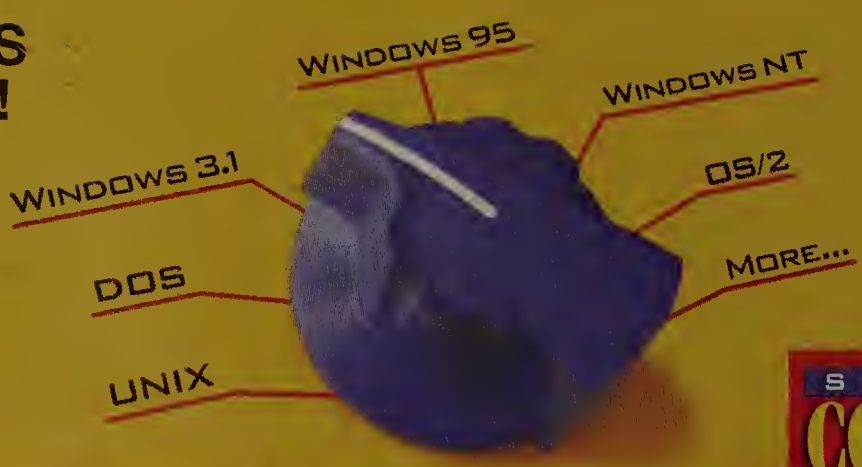

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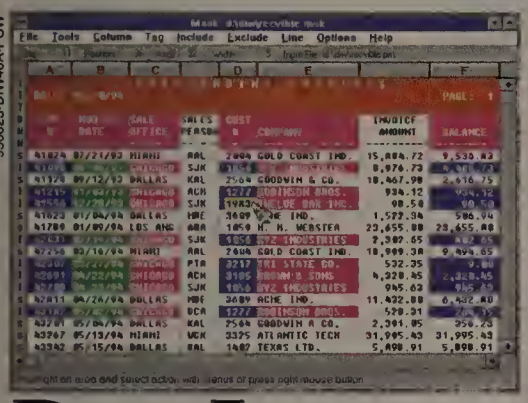

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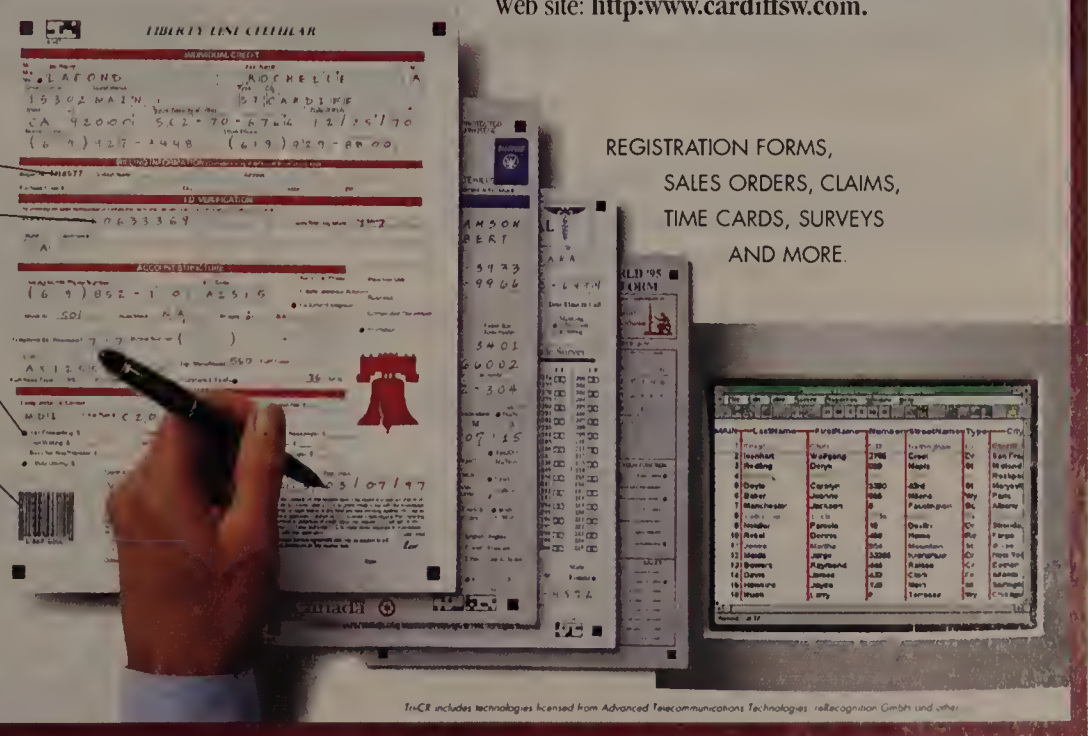

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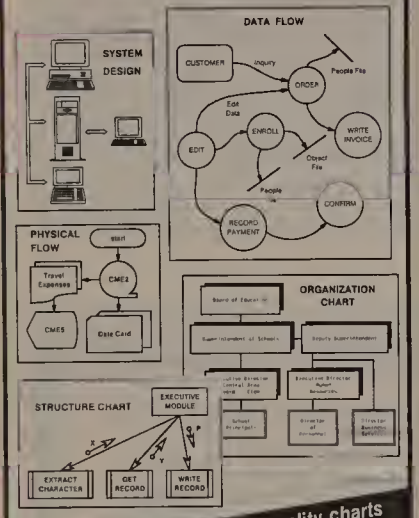

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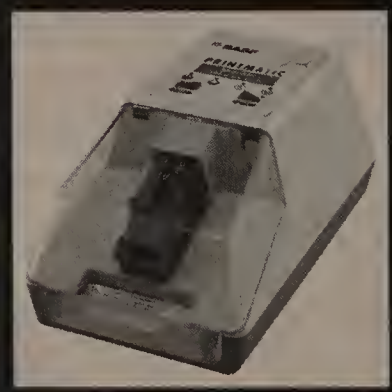

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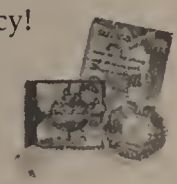

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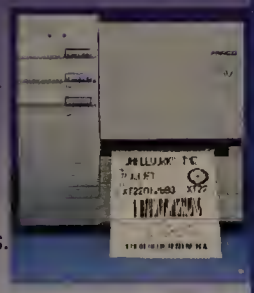

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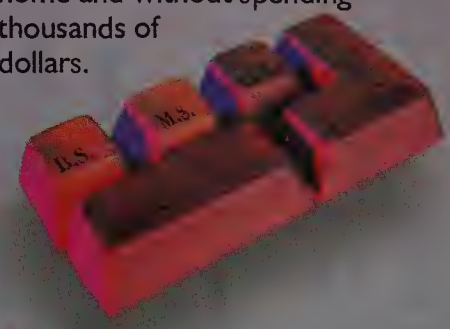

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959 Multimedia products
960 Utilities
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962 Storage devices

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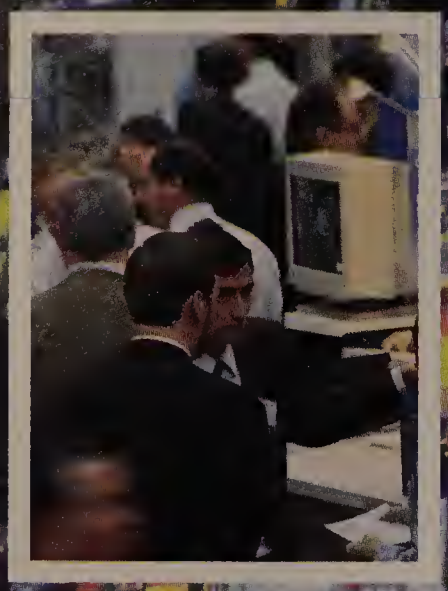

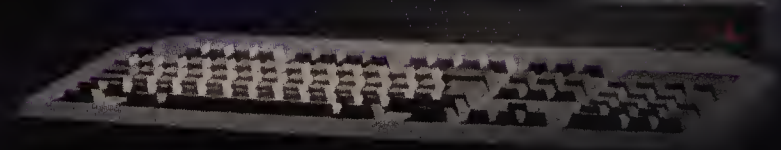

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Circle 81 on reader service card

Software Today: It's All Beta

"I DON'T USE BETA SOFTWARE," I proudly declared. "It's my policy to keep it well away from my machines."

"I've got news for you, buddy," a hard-bitten editor retorted. "Nowadays all software's beta."

It took the better part of a second until I realized the editor was right. Now I've got more news: It's going to get a lot worse before it gets better.

This is a little-discussed consequence of life on the Internet, like software hacking and copyright violation. We've all heard the positive spin: Once every machine is connected to the Web, software will be updated constantly so that you'll always have the latest version. If that sounds great to you, you probably haven't been walking on two legs very long.

Just look at Web browsers. The minute a "final" version of Netscape Navigator or Microsoft Internet Explorer is released, it's followed immediately by a beta with cool new features. So do you use a theoretically stable version that can't do new stuff? Or do you pick the gee-whiz version with what Netscape forthrightly calls "known problems and bugs" and Microsoft euphemistically calls "known issues"—not to mention those unidentified or unconfirmed?

The answer, of course, may depend on how much havoc the new software can wreak. Beta 2 of Microsoft Internet Explorer 3.0, for example, could disable access to some password-protected Web sites and trash the toolbars in some apps, including Microsoft's own. The company did fess up to these problems on its Web site, but I would not like to have discovered them independently.

I just **found** a Web page announcing the **availability** of some interesting search software. The version? **Pre-alpha.**

So forget ratings for Web sites. Maybe what we really need is a rating system for beta software. Something like:

G (Generally safe): Will not trash your hard drive.

PG (Pretty good): Will not trash more than two data files a day.

R (Real close): Will not trash data but may affect the system in unpredictable ways.

NC-17 (Not certified for 17 more days): Almost ready, but in the right mood can still do awful things to bring your PC to its knees.

But ratings may not be enough. After all, the "everything's beta" idea also applies to software you already own. For example, you can see which version of Win 95 you have by clicking the System icon in the Control Panel. As I write, the current version is 4.00.950a, which comes with many new machines.

Can you buy the new version? Nope. The original, flawed Windows 95 is still on the shelves. An upgrade patch is free, but you'll have to download it from Microsoft's Web site. And if you ever have to reinstall your system software, you need to reinstall the upgrade, too.

The good news, at least in theory, is that software is becoming more modular. Instead of downloading a whole new version, you might just get a new chunk now and then, like the Win 95 fix. Modularity is also here in the form of the add-ins and plug-ins that customize browsers.

Still, the downside is evident. If the software has a few small glitches, you may hesitate to fix it for fear of adding a new bug or incompatibility. But if you don't fix it, you risk problems with new programs that assume you've got the fix.

And if you have to support other users, these slipstream upgrades and public betas can be a nightmare. Confronted with a Web site that demands the latest, greatest browser, many users are unlikely to fret about that little four-letter word "beta" and will download the current "prerelease" version of Navigator or Explorer. So what version was running on that machine that just crashed four times? And was it a plug-in or the program itself that caused the problem? Who knows? At the very least, betas and automatic upgrades had better come with a foolproof way of reverting to previous versions.

Lest you think the problem isn't getting worse, consider this: I just found a Web page announcing the availability of some very interesting search software. The version? Pre-alpha.

"You really ought to try it," a publicist insisted.

Me, the guy who doesn't even do beta? "Pre-alpha used to be reserved for people who could count in hexadecimal backwards," I snorted. "Will it do anything nasty to my machine?"

"It shouldn't," came the reply. "I mean, I don't think it will. Anyway, I sure hope it won't."

"Thanks," I said politely. "I think I'll wait for the beta." ■

PC World *Contributing Editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

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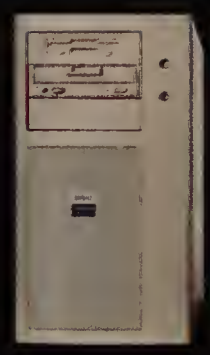

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